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Apprenticeship Committee Promotes Success of Training Program

By C. J. FREUND

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THE principal difficulty confronting the manufacturer who desires to introduce apprentice training in his plant is undoubtedly the natural antagonism of his employees toward any new undertaking. Most people enjoy variety and change in friendships, living conditions and amusements but resent innovation in work and methods of work.

Air rammers in the foundry were surely an improvement over hand ramm- ing, but mold- ers vigorously opposed their introduction; the old carpenter carefully exam- ines the new electric screw driver and then discards it with the remark that the old tool is good enough for him. This uni- versal attitude is undoubtedly based largely upon laziness. To the average man no advan- tage appears

great enough to compensate for the labor and incon- venience of adjusting his habits of work to something new.

Other objections to apprentice training appear more reasonable. Foremen and department heads maintain that they are already overburdened; they

must get out production, care for machinery, plan their work properly and give their men the necessary attention. They contend that they cannot be expected to train young men in addition to their other duties. Moreover, many foremen and department heads find it extremely difficult to keep down costs in their depart- ments and do not wish to train apprentices be- cause they fear it would add still more to their expenses.

Most fore- men and me-



Many in charge of departments doubt their ability to teach boys as they should be taught



The apprenticeship committee should see to it that conditions favorable to apprenticeship are maintained in the shop

The apprentice training course is a preparation for a lifetime of work and must be adequate and thorough (opposite page)

chanics are of the opinion that in order to be secure in their position they must always display complete mastery over everything that confronts them. Modern apprenticeship is no more complex than the training methods of 50 or even 30 years ago, but the new methods are different from the old, and school attendance, work schedules, supervision and other features undoubtedly baffle many foremen. Accordingly, they are skeptical about apprentice training and are afraid that they will be at a great disadvantage if apprenticeship is established.

Also, there are many in charge of departments who understand apprenticeship quite thoroughly and are much interested in young men, but doubt their ability to teach boys as they should be taught and are unwilling to assume this responsibility because they appreciate the importance of an apprentice training course in the career of the young man.

Skilled mechanics frequently oppose apprentice training in order to prevent the development of a new generation of trained young men who may contend with them for their jobs.

Apprentice Committee Can Overcome Obstacles

These are a few of the more important of the many difficulties that stand in the way of the institution of apprentice training and they must be overcome before the project can be successful. Certain requirements must be met for the solution of these problems. The first requirement is undoubtedly the determination of the management that training shall be established in the plant. Another is the appointment of a supervisor or director who shall be responsible for the work. It might be well to include among the requirements a strong apprenticeship committee

composed of shop officials. Neither the director nor supervisor, nor any single official, can ordinarily or easily overcome objections to apprenticeship that are based upon deep-seated opinions and prejudices. A strong committee, however, can put it over.

Training Must Be a Company Project

A committee of prominent officials almost immediately removes the principal difficulty, conservatism or antagonism toward innovations, for the simple reason that this antagonism is usually directed against schemes introduced by "outsiders". Whatever is begun or promoted by "our own people" is more easily given respectful consideration.

An old foreman was approached by one of the younger of his fellows, who remarked, "I see where all of us, you and I and everybody, will soon have apprentices in our departments."

"Do you mean kids who are supposed to learn to be machinists?"

"You bet."

"Who told you that?" the older man asked.

"I heard them talking about it after the cost meeting this morning."

"Somebody, some 'wise guy,' some consulting meddler has again pulled the wool over the old man's eyes and sold him a lot of nonsense for a couple of thousand dollars."

"It seems not," the young man explained, "the old man is interested all right, but the idea is being pushed by a committee made up of the master me-

☐ **An apprenticeship committee is useful in winning employee support of a training plan.**

☐ **By its very existence the committee serves notice on the entire plant organization that the training work is to be taken seriously.**

☐ **The committee gives stability and dignity to the program.**

☐ **It inspires confidence in the plan among apprentices and their parents and friends.**

chanics, the superintendents of the machine shop and forging departments, and the tool room foreman."

"That's different. Those fellows know what conditions are like and they'll be reasonable. Besides, if we don't like what they're doing we can talk to them. When is all this going to start? I suppose we ought to find out what's going on."

How a Successful Training Plan Was Introduced

In a certain Mid-Western machinery building plant, an energetic and intelligent committee converted a shop organization that was violently opposed to apprenticeship and built up a highly successful training department. The procedure was as follows:

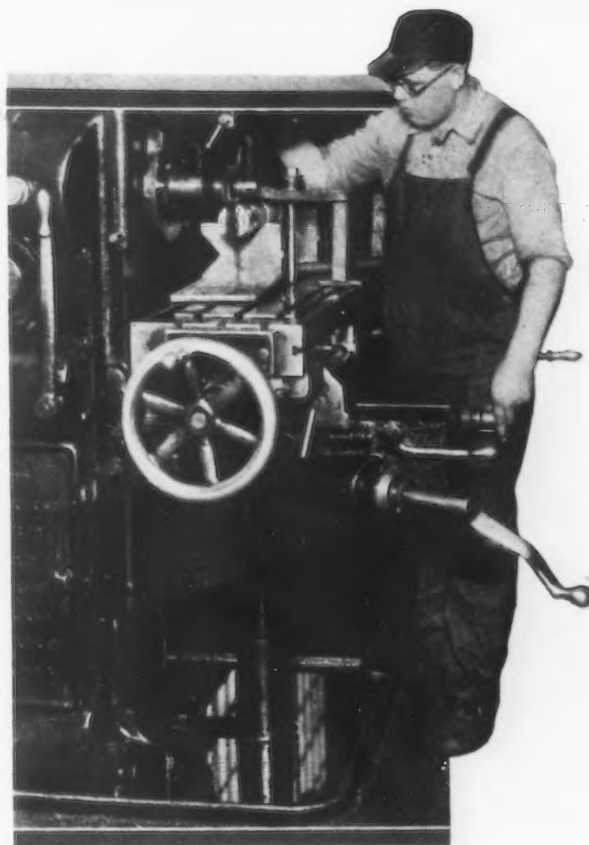
1. The members of the committee made themselves thoroughly familiar with their subject. They read what books and pamphlets were available and the articles on apprentice training printed in current publications. They secured as many apprentice training booklets of manufacturing plants as possible and studied the work and pay schedules and methods of supervision explained in them.

2. The committee met and developed general arguments in favor of apprentice training, such as the scarcity of skilled workmen, the advantages of organized over haphazard training and the need for attracting a better class of men to the industry.

3. The seven members of the committee apportioned among themselves all key men in the organization, and each one was made responsible for arousing the interest of those assigned to him.

4. Each committee man made an attempt to convince the key men on his list. He took careful note of the objections raised by those whom he could not convert.

5. Thereupon, the committee held further meetings to develop satisfactory answers to the objections encountered by the members. To the objection that training apprentices means additional work for the foreman they made the answer that men must be trained in any case and that to train apprentices systematically is more effective than to train operators in a haphazard manner. Those who were skeptical because they did not understand apprentice training were to be invited to attend a committee meeting where their questions would be answered. The committee denied the argument of high costs as a mere assumption, because apprentice training has not been found expensive in those shops where it is successfully carried on. They planned to reassure those who doubted their teaching ability by pointing out to them that instructing appren-



tices is no more difficult, in fact probably easier, than teaching machine operators. For the benefit of those who feared the competition of trained young men in the plant, they established a quota of apprentices just large enough to supply sufficient graduates every year to replace the normal annual loss of skilled mechanics as determined by reliable statistics.

6. Armed with these ideas the committee men again sallied forth, and it is perhaps needless to say that within a few months they had overcome the objections and fears of the members of the organization and before long an effective apprenticeship had been established in that plant.

Maintaining a Plan Harder Than Starting It

Not all is done when the apprenticeship system has been established in a plant. Maintaining apprenticeship requires as much attention and care as starting it. Failure to appreciate this has ruined many an ambitious training plan. The difficulties of maintaining the institution are frequently more serious than those which attend its establishment for the reason that they are based upon actual experience rather than upon prejudice. Committee action is an excellent way to overcome these difficulties and if the committee has been in existence from the beginning and has installed the apprentice training program, the members have had so much experience that they can readily overcome the current operating problems of a training department.

Transfers of Apprentices

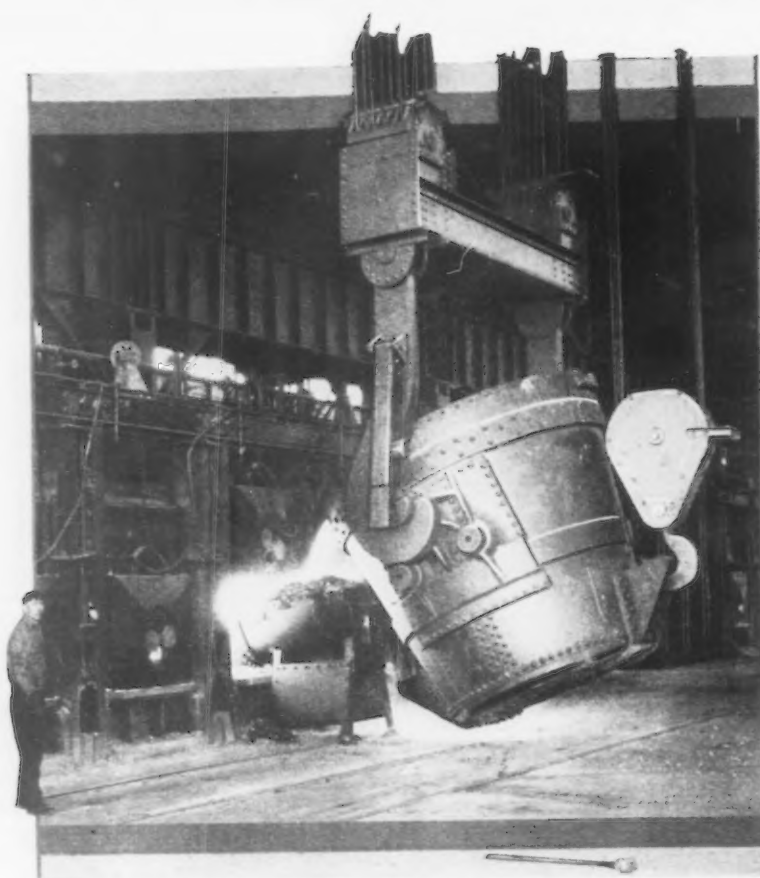
An example of such a problem is the necessary transfer of apprentices from one operation or machine to another or between departments or divisions of a plant, which sometimes appears practically impossible. Consider the case of an apprentice who has completed

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¶ A committee member should have prestige and should be enthusiastic about apprenticeship.

¶ A definite plan for committee meetings should be prepared in advance. It is frequently advantageous to send copies to members so that they may prepare suggestions.

¶ The committee is helpful in modifying a theoretically correct program to suit local conditions.



Basic Open-

By J. F. HORAK

*Research Metallurgist, Lukens Steel Co.,
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of the scrap used, the grade of steel manufactured, the process itself, the experience and care exercised by the melter, and finally by the attention paid to it in the slag pit.

Open-hearth slag differs materially from slag taken from pre-heating furnaces or soaking pits. The latter, consisting substantially of ferrous silicates, have a relatively low melting point. They soften and melt in parts of the blast furnace where the other stock is little affected, and tend to form conglomerates which are accessible only with difficulty to the action of the gases. The slight density as well as

the glassy surface of such lumps prevents its proper reduction for the process. And the high specific gravity causes these lumps to descend faster in the stack than the other stock. These conditions act unfavorably upon coke consumption, especially when a considerable amount of this slag is charged. Its only obvious advantage is its higher content of iron and lower content of phosphorus, the latter being important in making low-phosphorus pig iron.

Basic open-hearth slag has a higher melting point than heating furnace or soaking pit slag, because of its basic character. As it has also a lower specific gravity, the lumps do not overtake the remainder of the charge in passing down through the furnace. Moreover, its porous surface permits the gas to act on it and prepare it better for its ultimate use. Its character causes the formation of a proper blast furnace slag, with a lower heat consumption, just as if this slag were formed by means of limestone.

Recovery from Open-Hearth Slag

Manganese recovery varies from 45 to as much as 75 per cent. The amount depends upon the slag conditions of the blast furnace, especially its basicity and quantity, the grade of pig iron being made, particularly with regard to silicon content, and with the proper working of the furnace. The phosphorus content of the open-hearth slag is naturally a very unwelcome ingredient. This limits its use to production of basic pig iron or for some grades of foundry iron where the higher phosphorus range is essential. The basicity of the slag makes it possible to lower the amount of limestone put in with the charge.

MECHANIZATION of the American steel industry has reached a high degree of perfection. Meanwhile, however, many materials are wasted which might be recovered as by-products and add to the profits of the companies. Utilization of these products now going to waste is far behind that prevailing in many European plants.

Production here has been speeded up. Capacity has been doubled through the use of ingenious machinery. Hand labor has been cut to the minimum, with considerable savings in production costs. But these results are not in harmony with what has been going on along metallurgical lines.

Too much blast furnace gas is still being wasted or unprofitably used. Blast furnace slag is only partially utilized, whether for cement or for paving or for other building material products. The greater portion of it is still carried off and dumped in the molten state upon slag heaps. Correct utilization of the raw material as well as the by-product is the most rational way to cut production costs. Losses occasioned by improper materials and waste of by-products may exceed, several times over, the labor saving produced by mechanical devices.

Open-Hearth Slag a Valuable Product

One valuable by-product of the steel plant is the basic open-hearth slag. This is a suitable material for blast furnace use because of its chemical composition, as well as for its physical properties. Recovery of its iron and more particularly its manganese content, together with its basicity, gives it a considerable value.

Of course, its chemical composition varies broadly. It is affected by the composition of the pig iron and

Hearth Slag as a Valuable Blast Furnace Material

Basic open-hearth slag containing about 20 per cent silica, 42 per cent lime, $7\frac{1}{2}$ per cent magnesia and a like amount of manganese, 13 per cent Fe and 3 per cent Al_2O_3 , sets free an amount of bases equivalent for each 100 lb. of slag to about 36 lb. of limestone, with 97 per cent $CaCO_3$.

These bases are, of course, superior to those regularly acquired from the limestone charge, being already devoid of the CO_2 .

Limestone in the blast furnace charge must, in fact, be considered as a necessary evil. Its burning in the furnace is uneconomical and metallurgically wrong. It consumes a portion of the valuable heat and the escaping CO , lowers the partial pressure of the reducing elements. In this way it requires the blast furnace processes to be carried out with a somewhat higher coke consumption than otherwise. With our present state of knowledge it is purely an economic question, rather than technical, of using limestone in preference to burnt lime.

The chief benefit of using basic open-hearth slag in this manner lies in its manganese content, which directly increases the manganese in the resultant pig iron.

Clear Relation between Good Iron and Good Steel

Sequences of good and bad melts in both Bessemer and open-hearth plants indicate clearly the relation of pig iron quality to the steel-making process. Bessemer blowers are well aware of the fact that a sharp, fluid pig iron is easily blown down to the desired specification. It produces better steel than a dead-looking, muddy pig iron, even though showing the same chemical composition.

Suitability of a pig iron for the open-hearth process is determined not only by its chemical composition, but by its physical properties as well. While the latter depend upon the former, this is only to a certain extent. The

physical properties of the pig iron are the result of the whole complexity of facts determining the blast furnace working condition. The course of the reducing process, desulphurization of the pig iron, its carburization, reduction of silicon and manganese, rate of oxidizing in front of the tuyeres, all are important phenomena. And all, together, impart to the iron a definite property.

Manganese Content Is Important

When manganese is already present in the charge this permits desulphurizing and at the same time increases the fluidity of the pig iron in the furnace, besides having other beneficial influences. The resultant thin, fluid pig iron becomes better purified in the furnace and leaves it much cleaner. It is free of the so-called "bull-dog" silica inclusions, referred to in THE IRON AGE of May 15 last, page 1457.

Manganese content in the pig iron should be watched carefully by steel makers. Many plants in Europe are using pig iron with as high as 4 per cent of manganese. After the World War, disordered conditions forced some plants to produce basic pig iron of only 0.2 to 0.7 per cent manganese content. Results in the steel plant did not show satisfactory product in the open-hearth process, even with the manganese increased by addition of ferromanganese. This experience confirms the statement above, that the proper physical properties of the pig iron must be acquired in the blast furnace itself.

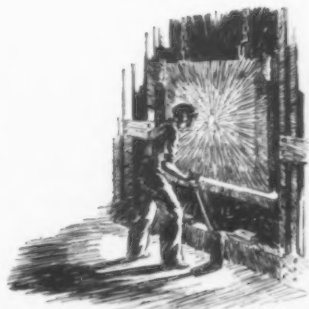
In connection with its influence upon the course of the whole blast furnace process, the absolute amount of manganese in the pig iron may impart to the iron those physical properties desired. The advantage of higher manganese in pig iron for open-hearth use may be summed up as follows:

There is a better refining operation in the furnace, resulting in cleaner, better steel. It shortens the time of the heat. For this

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A MERICAN steel men have been throwing away a valuable product—and, incidentally, spending good money in getting rid of it—according to the author, who was formerly assistant blast furnace superintendent of the Prague Iron Industry Corpn., in Czechoslovakia.

He tells here why open-hearth slag should be charged back into the blast furnace as a raw material of considerable value.



Crankshafts Basic in Power

By S. S. ERPWARD

THE heart of the press is the crankshaft. It is around this member that all stresses and strains are figured. So like "the wonderful one hoss shay," the crown must be as strong as the crankshaft; the base must be as strong as the crown, and the tie rods and the uprights sufficiently heavy to take care of the load and reaction when the crankshaft is operating under the maximum capacity.

Crankshafts of the better grade are usually made from open-hearth steel of about S.A.E. 1050 specifications. Before turning, the forgings are very carefully normalized to remove all internal strains. Such a crankshaft has a tensile strength of about 85,000 lb. per sq. in., This is the kind of crankshaft which is

THIS article is addressed not only to designers but to users of power presses. In designing such machines the crankshaft is the "determining factor" and consideration of some of its varieties and the parts influenced by its proper design may well add to the working knowledge of plant executives, upon whose intelligent selection, use and maintenance of equipment, depend in no small degree the net profits of the manufacturing enterprise.

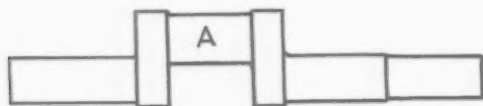


Fig. 1—Single-throw crankshaft

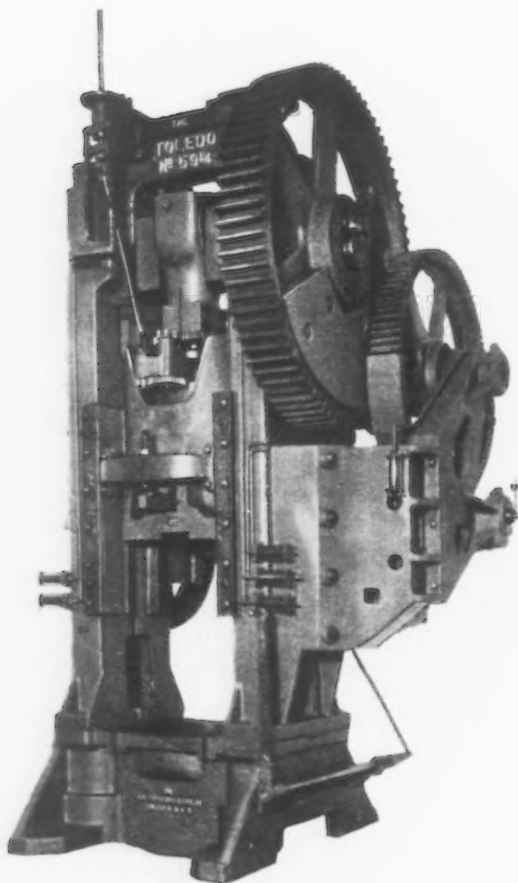


Fig. 2—Press with single-throw crankshaft

most often considered when designing the frame of the press.

In some cases, the tensile strength of the shaft is increased approximately 100 per cent by a special heat treating process, which brings the tensile strength up to about 160,000 lb. per sq. in. This heat treatment is not necessary in all cases. Whenever used, however, it must be with the greatest caution, as frequently it brings the strength of the crankshaft far beyond that of the other parts, making liable the possibility of a broken frame.

The design of the crankshaft has much to do with the ultimate pressure that may be exerted at the bottom of the stroke, and this should be carefully considered when designing the other parts.

Computing Pressure of Crankshaft

Fig. 1 shows the type of crankshaft which is in general use on most single-crank presses. The connection bearing A is preferably made of somewhat larger diameter than the frame bearings, to give a larger bearing surface and to increase the strength of the shaft at this point.

Exhaustive tests have made it possible to establish a rule of thumb that quite accurately determines what pressure a crankshaft of the above type may be counted upon to exert at the bottom of the stroke. The rule is:

$$(\text{Crankshaft diameter})^2 \times 3\frac{1}{2} = \text{pressure in tons obtainable at the bottom of the stroke.}$$

The above rule holds good up to a certain length of stroke. If the stroke becomes excessive in proportion to the diameter of the shaft, then the factor of torsion enters into the problem, and, of course, makes it more complicated. The rule as stated, however, could be considered approximately correct in all cases where the stroke of the crankshaft does not exceed twice its diameter.

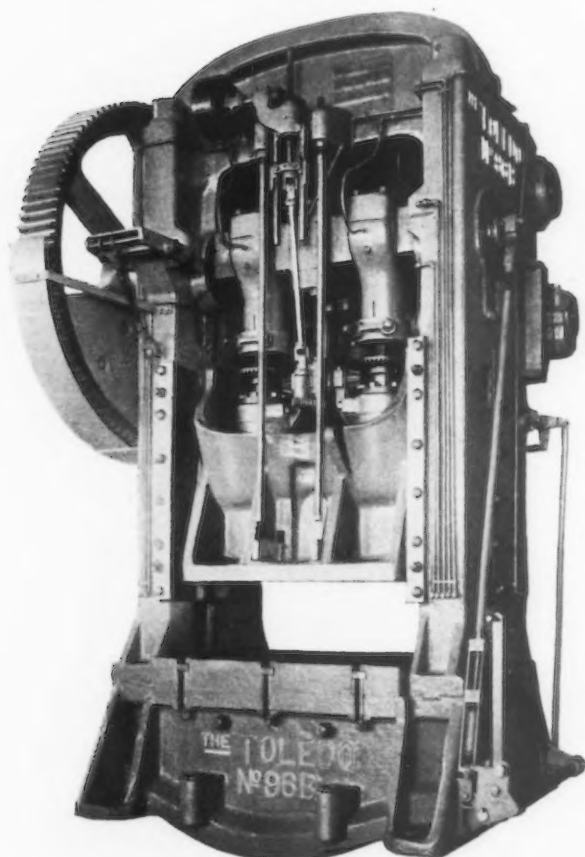
Press Design

The press illustrated in Fig. 2 has a crankshaft of the type described in the foregoing.

The average-double press also has a crankshaft similar to the above. Such a shaft is shown in Figs. 3 and 4. Shafts of this design have substantially the



Fig. 3—Double-throw crankshaft



No. 4—Press with double-throw crankshaft

same pressure capacity as single-crank presses except in the larger sizes. The table will be of assistance in arriving at the pressure capacities of single and double-crank presses with standard crankshafts.

Where the Rule Doesn't Hold Good

There are some special conditions where the rule which we have given does not hold good—for instance, on some single-crank presses with very long stroke, or on double-crank presses of great width or with a long

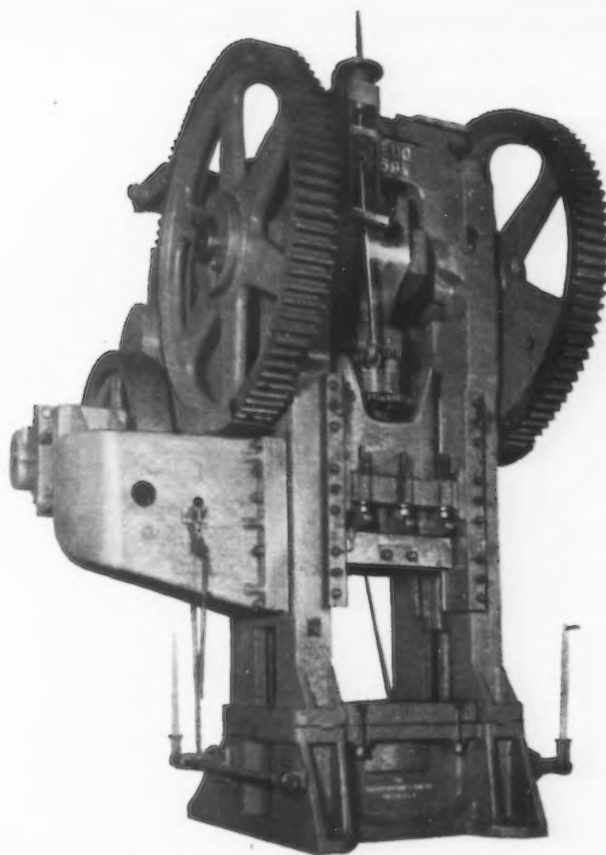


Fig. 5—Single-crank press with twin gearing

Pressure Capacities of Presses with Standard Crankshafts

Crank-shaft Diameter (Inches)	Tons		Crank-shaft Diameter (Inches)	Tons	
	Single-Crank Press	Double-Crank Press		Single-Crank Press	Double-Crank Press
1 1/2	6	...	6 1/2	150	150
1 1/2	7.5	...	7	180	180
1 3/4	9	...	7 1/2	215	215
1 3/4	10.5	...	8	255	255
1 7/8	12	...	9	345	345
2	14	...	10	440	450
2 1/4	16	...	11	545	650
2 1/4	18	...	12	665	900
2 1/2	22	22	13	790	1,150
2 3/4	26.5	26.5	14	920	1,400
3	31.5	31.5	15	1,060	1,700
3 1/4	37	37	16	...	2,000
3 1/2	43	43	16 1/2	1,300	...
4	56	56	17	...	2,300
4 1/2	71	71	18	1,560	2,700
5	88	88	20	1,950	...
5 1/2	106	106	22	2,380	...
6	126	126	24	2,860	...

stroke, and on single and double-crank presses with "twin gearing," or with a gear on each end of the crankshaft. This arrangement increases the gearing strength and torsional capacity of the crankshaft and in the case of wide double-crank presses reduces the torsional deflection of the crankshaft. Under these conditions, the load at the bottom of the stroke would still be limited by the figures in the table.

A single-crank press with twin gearing is shown in Fig. 5.

Eccentric Crankshafts

In some few cases full-eccentric or semi-eccentric crankshafts are desirable. Fig. 6 shows the eccentric shaft and Fig. 7 the semi-eccentric shaft. These types of crankshafts are sometimes used for heavy cutting,

embossing and forming operations where the frame has been especially designed for the purpose. In order to get the best results from these types of shafts, it is necessary that there be but a minimum amount of clearance between the frame bearings and the cheeks of the shaft. The design then is such that the pressure puts a shearing rather than a bending load on the shaft.

If the frame has not been strengthened, there is no great advantage in using this type of shaft, as the

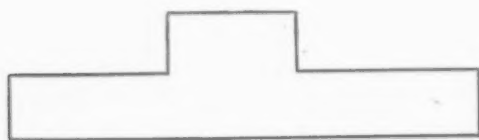


Fig. 6—Single-throw full-eccentric crankshaft

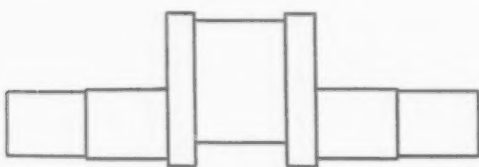


Fig. 7—Single-throw semi-eccentric crankshaft

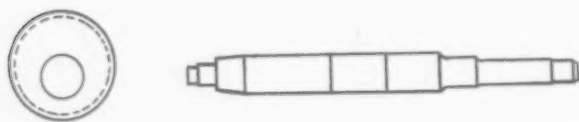


Fig. 8—Straight crankshaft with keyed eccentric

extra pressure exerted is likely to prove detrimental to the frame. Furthermore, these shafts limit the stroke, which should not be over one-half of the diameter of the shaft, although, in some cases, it has been made equal to the diameter of the shaft. In a recent instance, a press was built with a shaft having 15 in. in diameter for the frame bearing, with a 14-in. stroke, making the diameter of the connection bearing 29 in.

Crankshafts for End-Wheel Presses

Then there comes for consideration the crankshaft which is used in the end-wheel type of press. There are preferably two distinct designs, as shown in Figs. 8 and 9. In Fig. 8 the shaft is straight, with the eccentric keyed to the shaft. This eccentric with suitable connection gives motion to the slide. The shaft in Fig. 9 is made extra large at the main frame bearing, and the pin for the slide connection is of sufficient diameter to obtain the desired pressure. There is no fixed rule for figuring the pressure capacity of these shafts, as so many different factors have to be considered. Press builders usually give the tons rating on presses having this form of construction. As a rule, the stroke is limited.

The press illustrated in Fig. 10 has a crankshaft like that shown in Fig. 9.

There is also the crankshaft used in presses requiring no appreciable effort on the part of the shaft, yet on the aggregate exerting a pressure far in excess of that which can be obtained in any exclusive crankshaft press. We refer to the crankshaft in the knuckle-joint embossing press.

A typical shaft of this character is illustrated in Fig. 11, which also shows the knuckle-joint arrangement. The purpose of the crank is solely to straighten the knuckle, which causes a downward motion of the slide and through solid metal exerts a tremendous pressure on the work.

Presses with this form of slide motion are built for practically any ton-pressure that might be required. A modern machine of this character is shown in Fig. 12. While originally intended for a comparatively short stroke, machines of this type are now built so that they can be furnished with any reasonable amount of stroke or slide travel.

These presses were formerly intended for coining operations, but comparatively recent developments have shown that they have a wide range of usefulness for heavy embossing and swaging work, on such work as coins, medallions, watch cases, rail bonds, name plates, escutcheon plates, hinges, fancy door knobs, knife handles, heavy hardware specialties, and a large variety of other work requiring a slow, powerful pressure during only a short portion of the stroke.

The development of this machine, however, has not been confined solely to the work of sheet metal, for the

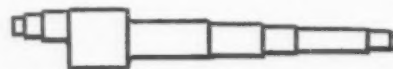


Fig. 9—Standard punching press crankshaft, with main frame bearing extra large

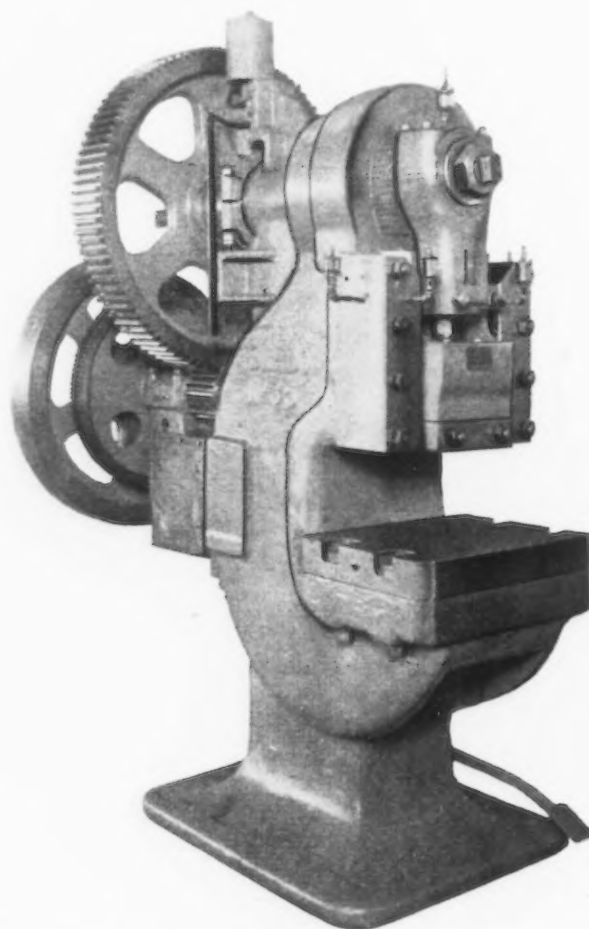


Fig. 10—End-wheel press with extra large main frame bearing

demand for accurate duplication of parts in great quantities has resulted in this type of press being used for sizing forged steel parts which were formerly finished by straddle milling and similar operations.

It is claimed that size limits of 0.001 in. can be successfully maintained in productions of this character. One large user has stated that a coining press will squeeze parts to size with the same degree of accuracy as is possible by the removal of surplus stock through cutting operations; also, that there is no appreciable difference in the molecular constituency of the parts after they have been squeezed, and that under quantity production conditions the average number of parts prepared per hour by an embossing press of this character is 900 per cent greater than is secured by the usual machining methods.

Treating Aluminum Alloys with Volatile Chlorides

GAS Removal and Grain Refinement of Aluminum Alloys was discussed in a paper before the Institute of Metals (British) by Dr. W. Rosenhain, J. D. Grogan and T. H. Schofield. A number of se-

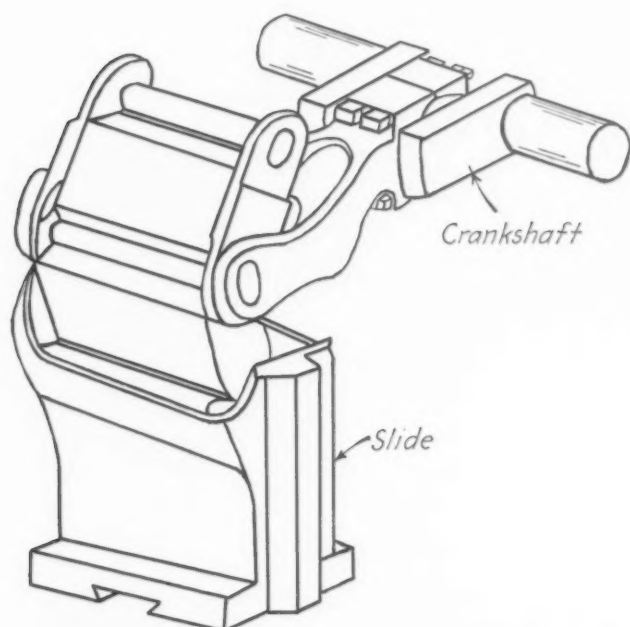


Fig. 11—Knuckle-joint embossing press, showing relative position of the crank and the slide

lected volatile chlorides were passed into molten aluminum and certain alloys. All were found to be efficacious in removing dissolved gas from the metal. Some, particularly titanium tetrachloride, also produce a marked reduction in grain size. The reduction of grain size occurs also when titanium is added to aluminum in the form of titanium-aluminum alloy produced by the Thermit process.

In the discussion, D. R. Tullis said that the method of employing a grain-refining element, combined with chlorine, had been developed in his own laboratory. It produced a very desirable result, and had the advantage of combining the two operations in a single process. The most effective substances

known at present to produce this combined result were the chlorides of boron, titanium and vanadium.

G. Mortimer said that the use of titanium tetrachloride has been tried on quite a large scale in his foundry with very successful results, provided the correct temperature at which to apply the gas were adopted. This temperature varied with the particu-

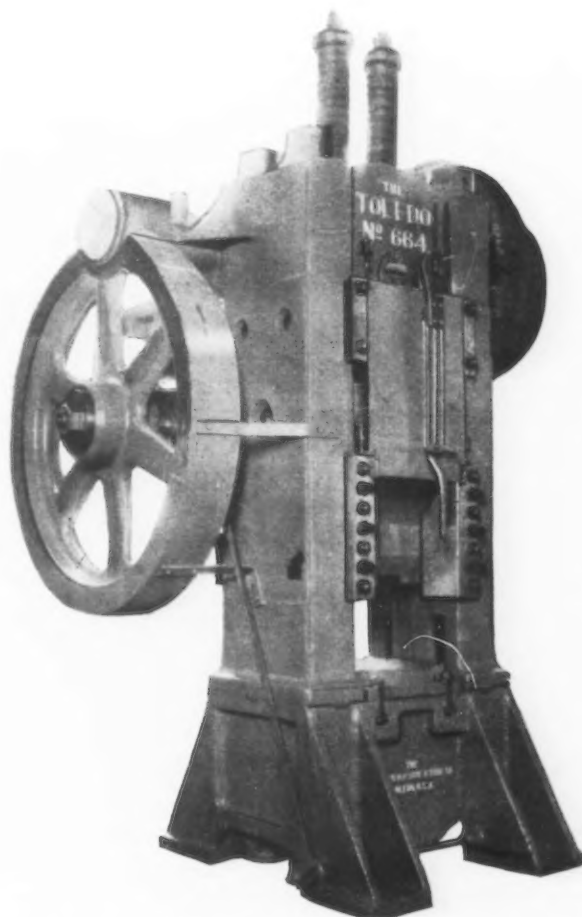


Fig. 12—Knuckle-joint press. Originally intended for coining operations, this type of press has found a wide range of applications

lar alloy employed. The only trouble was that quite a small amount of the volatile chloride accidentally spilled on damp sand gave rise to volumes of dense white fumes. The best method of introducing the chlorides was to saturate some dry asbestos wool with the required quantity of the liquid and place it quickly at the bottom of the melt.

Dr. Leslie Aitchison stated that his firm had also carried out trials on a practical scale. He was convinced, as was Dr. Rosenhain, that the process achieved the main object, namely, that it removed all the harmful gases from the aluminum. He hoped Dr. Rosenhain would evolve a suitable method for applying the process in practice.

H. Sutton stated that the melting of aluminum light alloys in a gas-fired furnace had always given rise to unsoundness and blow-holes. He was pleased to find, therefore, that the authors had commenced by melting their alloys in a gas-fired furnace. They had deliberately introduced difficulties and had then set to work to get rid of those same difficulties.



Suggestions for the Care and Conservation of Wire Rope

By A. E. CRIPPS

John A. Roebling's Sons Co., New York.

DURING the past five years much has been learned relative to the manufacture, handling and operation of wire rope, a sensitive and complete mechanism which can be considered as machinery. There are many varieties of ropes to choose from, and each particular construction and grade of rope has been developed for a specific purpose. A wire rope designed for use on a steam shovel will not operate to advantage when used on a passenger elevator.

Each particular problem requires careful and individual study. Certain definite rules have been laid down regarding the construction and care of wire ropes. If these principles are violated the life of the rope is materially shortened and the result may be disaster, for in many instances human lives depend on them.

Importance of Proper Uncoiling or Unreeling

In the manufacture of wire rope the best raw materials are selected for the steel that goes into the product. Analyses are taken at each stage of the steel-making process and tests for tensile strength, elongation, torsion and bending are carried out on individual wires. Care is taken to lay the wires in the strand and the strand in the rope under uniform tension. After the finished product leaves the factory its care becomes the concern of the purchaser.

But the care of wire rope begins before it is put into service. There are two ways of shipping wire rope. Long lengths and ropes of large diameters go on reels, and short lengths of medium diameters in

coils. In taking wire rope from a reel the latter should be mounted on jacks and the rope pulled off while the reel revolves. If from a coil, the coil should be rolled along the floor. A reel or coil should never be laid on the floor and the rope pulled over the side, as this method results in kinks and an excessive twist.

The ends should always be properly secured by "seizing" before a length is cut off. Otherwise, by improper handling methods, the original relation of tension on the wires and strands becomes disturbed, and therefore the maximum of service will not be secured. This arises from the fact that some strands will be forced to carry more than their due share of the load. It must therefore be borne in mind that rope distortion results from improper handling, unreeling, seizing and socketing.

Proof has been given invariably that the lower grade or cheaper ropes are not economical. Final analysis shows that the correct construction and quality are of primary importance. And the factor of safety at the time of removal of a wire rope from service should receive consideration in this respect, too.

Personal Equation Affects This Temperamental Product

Service records on one installation cannot be correctly compared with those on another installation, even though they be exactly similar so far as the usual data are concerned. The human element must be considered. Does the engineer start and stop his machine with care? Does he wake up with a grouch in the morning and take it out on the hoist? It is therefore

necessary to consider each installation as individual, and to make the necessary studies, and from these the proper recommendation.

A worn rope shows by its exterior surface whether all of its useful life has been obtained. By a comparison of worn ropes is learned the relative amount of work accomplished by the ropes. Ropes worn to the same extent can safely be assumed to have performed the same amount of work. From this it can be determined whether or not the efficiency of the operation and of the equipment has been the same in both instances. It is upon these factors that one decides whether useful work has been equally accomplished by both ropes.

This suggests that a great amount of non-productive work is performed by wire rope. It may take the form of cutting grooves in sheaves which are too small for proper operation, or on rollers which have worn down to too small a diameter. There is also greatly increased abuse from additional vibrations and hammerings not present in the first place. There may also be indications of possibly unsatisfactory lubrication of one rope, compared with a previous rope, which would result in more rapid wear and deterioration.

Winding the Rope on Its Drum

A FEW points on design, operation and upkeep may be mentioned as materially affecting wire rope costs. Adherence to proper standards should result in more economical wire rope service. Drums should be liberal in design; in fact, in some instances, more liberal than is usual in standard practice. Rope should wind in the drum with as few layers as possible; where there is a greater number of layers, the drum diameter should be correspondingly increased, so as to reduce the severe crushing pressures set up thereby.

Drums should preferably be grooved, and the pitch of the groove should not be too small; neither should it be too large, if additional layers of rope are to be wound.

The fleet angle of the rope on the drum should be maintained within the usual limit, usually taken at $1\frac{1}{2}$ deg. This varies, of course, with the ratio of the rope diameter to the drum diameter.

Drums Must Be Adequate for Their Work

On the subject of drums there must also be a consideration of the material of which they are made. Cast iron is most usual, but it is sometimes found that steel castings are necessary. Use of too weak a material increases wire rope costs and means more frequent drum replacements.

Where plain-faced drums are used, a steel starting piece should be employed which will help to start the rope winding in a true helix. The hole through the drum should be placed as close as possible to the flange.

so that the rope starts to wind adjacent to the flange. Care should be taken to give the rope a good radius rather than a short break over the drum face. It is as well to bear in mind that worn flanges influence the winding of the rope.

Plain-faced drums become grooved, these grooves being formed by rope which has become worn to a reduced diameter. Therefore the pitch of the grooves is less than would be proper for a new rope. When new rope is wound on a drum of this type it therefore becomes subject to considerable extra abrasion, resulting in a shorter life. In the same way, grooved drums have the grooves worn to such an extent by an old rope that a new rope, when placed in operation, gets pinched. This is a difficult situation to correct, but it must of necessity be taken into consideration.

Corrugations in Drum Surfaces

Another point in connection with drums, both plain and grooved, is that they become corrugated by the lay of the rope. Such corrugations should be eliminated before a new rope is put into service. These defects are due to drum material of insufficient hardness and to excessive unit radial pressure. This latter is influenced by the drum diameter and the operating tension of the rope.

Sheaves and rollers of ample diameter are necessary, also. Here again the grooves may be improper for the installation of a new rope. They should be at least $1/32$ in. above the new rope diameter. Sheaves and rollers which are too small will add greatly to wire rope abuse, not only because of additional bending, but also by the additional abrasive action produced.

As was mentioned in reference to drums, if corrugations are found on sheaves these should be replaced whenever found and the reason for corrugation should be determined. When corrugated sheaves are found the remedy is either in substituting sheaves of a larger diameter or in making them of a harder material, better able to withstand the pressures involved.

Sheaves having grooves which have become deeply worn are a source of extra abrasion on the rope, due to the fact that the rope wears against the sides of the deep groove and the difference in peripheral speeds produces a decided grindstone effect. The condition should be thoroughly analyzed if the correct solution to the trouble is to be obtained.

Rollers Over Which Rope Works Require Attention

Another important consideration in the care of wire rope is that of roller equipment, since the amount of abrasion can be governed by the proper spacing of rollers. The spacing should be unequal, as this tends to break up rhythmic vibrations which may occur in rope, these having deleterious effects on its life and usefulness. It is also recommended that flat-faced

(Continued on page 1047)

True Plant Maintenance Work Reveals Points of Obsolescence

By R. H. ROGERS

Industrial Engineering Department, General Electric Co.

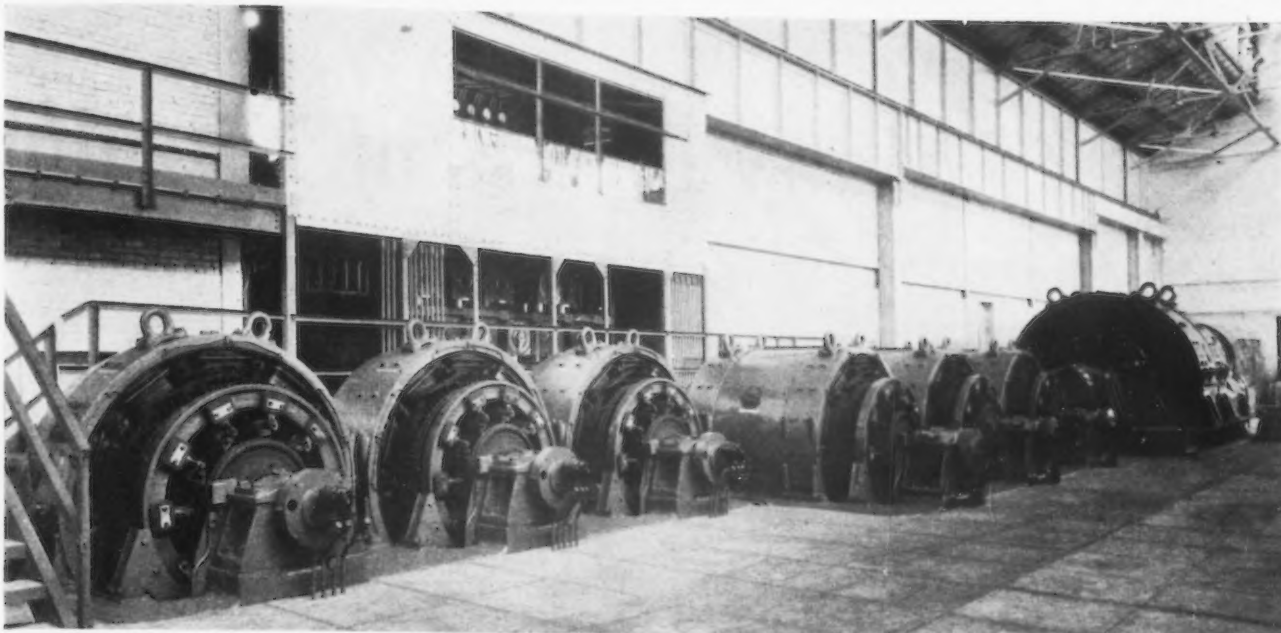
MAINTENANCE may be of the "main-strength" type where without question the same sort of repairs are made over and over on the same units. They are kept going, it is true, but at high cost. We are prone to become "mill-blind" unless we specifically guard against it. Shop troubles can repeat themselves until we are calloused to them and we assume without question the routine of making certain repairs or replacements periodically.

The unit in trouble must be studied first, and, if no cause is apparent, the search must extend both ways from the trouble point until the cause is run down and eliminated once for all. This latter procedure is especially applicable to electrical equipment. Take,

for instance, a case of motor trouble, perhaps the second occurrence. A study of the motor should include its starting duty, peak loads, average heating load, power factor and general behavior. If the motor has the proper characteristics for its work the examination should narrow down to physical and electrical conditions. If the cause of the trouble is not found here, the investigation should be extended to the driven load to determine if erratic conditions can occur to throw destructive loads on the motor. The power supply and control items should be investigated. Some inexperienced person may be mishandling the equipment. Voltage dips from some remote cause may be the offending item. The control equipment may not be



Marion electric power shovel of the Republic Portland Cement Co., San Antonio, Tex., is operated by three direct-current motors energized from a four-unit synchronous motor under Ward Leonard control. The system is said to use 30 per cent less current than an alternating-current shovel and the total operating cost is put at 3.62c. a ton



Six 1250-hp. direct-current motors driving finishing stands of a hot strip mill of the Sharon Steel Hoop Co., Sharon, Pa., are on one base. Two armatures, two bearings and one set of field coils serve as spares for six motors of widely varying torques and speeds

adapted to the application to which it is put.

Periodic studies should be made of electric power equipment because improvements are being made all the time by manufacturers and a type of equipment unsuited to a job five years ago may be the ideal unit today, while, on the other hand, the accepted standards of a few years ago are obsolete now and newly fitted out plants are being benefited by the improved designs and higher standards of the present.

Any motor or control over five years old should be coldly scrutinized for present day fitness so rapid has been electrical design progress. How is the management to know when to modernize or how except by the suggestions of those closely in touch with things as they are and as they should be?

Many schemes teeming with potential benefits have died in the heads or desks of the schemers because they were not brought out forcibly enough. Some may be too modest to bring their notions to those higher up, while others become discouraged at the first belittling comment. Worst of all is the "main-strength" maintenance man who takes the attitude that he is not being paid to improve conditions and maintains that he is there simply to keep things running as they are.

Synchronous motors have been so improved, particularly in starting characteristics, that they are now freely applied where but a few years

ago induction motors were used. Synchronous motor control has also been improved in many ways, among which are the prevention of stalling on undervoltage, etc. Full advantage can be now taken of the power factor improving characteristics of synchronous motors, together with their inherent adaptability to low-speed drives. The substitution of synchronous for induction motors at certain key points in plants has materially helped the normal operation of all the other electric apparatus and has made it possible to add much needed motor loads within the heating capacity of existing transformers and feeders.

Time delay undervoltage relays on all large motors are helping to maintain continuity of service. They allow motors to coast through voltage dips of short duration and save wear and tear on the whole system, which results from wholesale restarts after a momentary outage.

The wide and growing use of generator voltage control (Ward Leonard) for dc. motors in the presence of ac. supply has done much to reduce maintenance and increase production. It is agreed that a dc. machine may have a higher maintenance cost than that of squirrel-cage induction motor but considered overall, control, motor and driven machine, lowered maintenance cost is often the determining factor in favor of the dc. generator voltage control system.

(Continued on page 1046)

▲ ▲ ▲

THIS article is about the junk pile inside the plant walls. It is the job of the maintenance man to keep it down. To make repairs is not enough; he should seek for causes of breakdowns, to improve rather than just keep things running.

The rapid advances in machinery and equipment make for an amazing rate of obsolescence. The maintenance problem is only partly solved if the possibilities of replacement are not studied. The case of the electrical apparatus was recently set forth by R. H. Rogers, industrial engineering department, General Electric Co., before the Electrical Maintenance Engineers, and what is here drawn from it will be found replete with practical suggestion.

▼ ▼ ▼

Many Phases of Nitriding

TWO separate sessions at the National Metals meeting in Chicago were devoted to various phases of the subject of nitriding steels—a subject which gave rise last year (*THE IRON AGE*, Sept. 19, 1929, page 739) to a full day's symposium. One of these sessions was under the auspices of the American Society of Mechanical Engineers, with L. C. Morrow in the chair. The other, under the chairmanship of Dr. Victor O. Homerberg, was held by the American Society for Steel Treating.

In the A. S. M. E. session, a paper on "Case Hardening with Ammonia Gas," prepared by Dr. Victor O. Homerberg and Dr. J. P. Walsted, both of the Massachusetts Institute of Technology, was read by Dr. Walsted. A paper on "Nitriding Analyses—Their Physical Properties and Adaptability," prepared by Robert Sergeson and M. M. Clark of the metallurgical department, Republic Steel Corporation, Canton, Ohio (Central Alloy Steel Division), was read by Mr. Sergeson.

"Nitriding in Packing Materials and Ammonia," a paper by A. B. Kinzel and John J. Egan of the Union Carbide & Carbon Research Laboratories, Long Island City, N. Y., was read by Mr. Kinzel before the steel treaters. A paper "Further Investigations in Nitriding," by Robert Sergeson and H. J. Deal, was read by Mr. Sergeson. J. H. Higgins of the Camden Forge Co., Camden, N. J., read a paper, "Nitriding the Larger Forgings." W. J. Merten, of the Westinghouse Electric & Mfg. Co., East Pittsburgh, read a paper, "Nitriding Furnaces and Their Equipment," confining his discussion to electric furnaces. C. H. Bierbaum, of the Lu-

men Bearing Co., Buffalo, read a paper, "Microcharacter Hardness Tester."

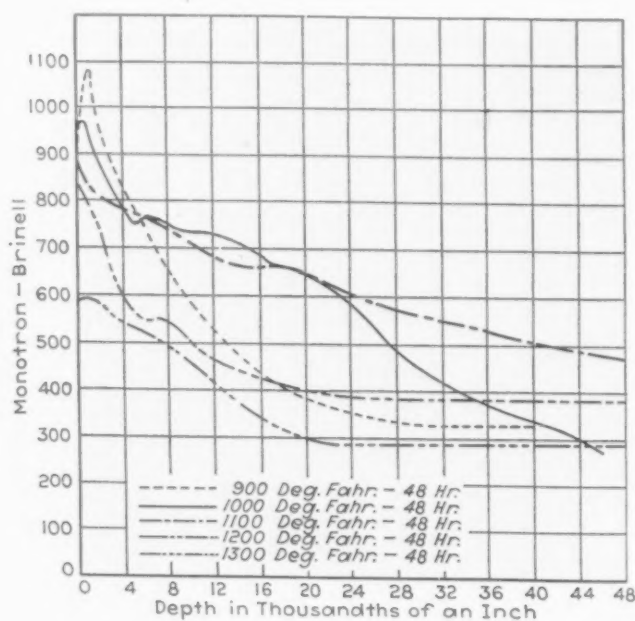
Brief extracts of these several papers in the succeeding pages are followed in each instance by the high points made in the discussions.

Case-Hardening with Ammonia Gas

IT has been the dream of metallurgists for many years to produce a steel of good toughness with maximum surface hardness and wear resistance. To produce these properties with a minimum of distortion has been the subject of much research work of a high order. In the past the most successful method of obtaining these properties has been by subjecting low-carbon steel to the action of a carburizing material at high temperatures.

Under these conditions the steel takes up carbon in its surface layer, changing that portion of the material into a high-carbon steel capable of hardening, while the core remains low in carbon, with the usual toughness and shock-resisting properties. By a suitable double heat treatment the core can be brought to maximum physical properties while the case can be made hard and wear-resistant. This process of case-hardening by means of carbon is somewhat cumbersome. The necessary heat treatment after carburizing is a frequent cause of distortion of the hardened parts.

A new process of case-hardening has been developed which has all the advantages of the older method. Besides being free from the troublesome warpage, it surpasses the older method in the hardness of the case



Hardness determinations on tapered specimens

Brought Out

NITRIDING, one of the newest of the steel treatments, is one which is attracting more and more attention as it is becoming better understood. Seven papers, dealing with the subject from as many different angles, were read at the Chicago Metals congress. Three of them are covered here, with the high points of the discussion which they evoked. The remainder will appear in an early issue.

produced. The classic research of Dr. Fry at the Krupp Works, Essen, Germany, is responsible for the introduction of this valuable metallurgical development.

Researches of a very high order in France and in this country have brought the process to its present high state of development. A great deal of credit is due Dr. Norton and Mr. De Fries of the Ludlum Steel Co. for the excellent work which they did immediately after the introduction of this process into this country several years ago. This new process, known as "nitriding," is now a commercial success.

Alloy steels showing the maximum surface hardness after exposure to ammonia gas under definite conditions are those containing varying amounts of carbon, together with 1 to 1.25 per cent aluminum, 1.5 per cent chromium and 0.2 per cent molybdenum. Two such steels reported upon in the paper had the following analyses:

	Nitralloy G	Nitralloy H
Carbon	0.36 per cent	0.23 per cent
Manganese	0.51	0.51
Silicon	0.27	0.20
Aluminum	1.23	1.20
Chromium	1.49	1.58
Molybdenum	0.18	0.20
Sulphur	0.010	0.011
Phosphorus	0.013	0.011

Exposure of articles to the action of ammonia gas varies from 2 to 90 hr., depending on the service which they are to perform and the conditions to which they are to be subjected. The nitriding temperature generally varies from 900 to 1000 deg. F., 975 deg. being commonly used.

A slight growth takes place during nitriding. Table I shows the increase in length and in diameter of cylinders of Nitralloy G previously oil-quenched from 1650 deg. F. and tempered at 1000 deg. F. for 4 hr., followed by nitriding at the indicated temperature for 48 hr. Prior to nitriding, these cylinders were ground accurately, after which they measured 5.8160 in. in length and 0.7100 in. in diameter.

Table I—Growth of Cylinders on Nitriding

Nitriding Temperature, Deg. F.	Increase in Length, In.	Increase in Diameter, In.
900	0.001	0.0003
950	0.002	0.0009
1000	0.003	0.0011

This growth can be allowed for in the final machining or grinding before nitriding, or it can be removed afterward by lapping or by some other suitable means. Advantage of this growth can be taken in the case of parts where their usefulness will be destroyed as soon as a slight wear has taken place. The renitriding of such articles, especially at a higher temperature, will produce sufficient growth to make them useful again.

It frequently happens that threaded portions or other areas must be protected, so as not to become surface hardened. Nickel plating gives satisfactory results; tin or solder may be used, provided certain precautions are taken. Only that amount of tin which can be retained by surface tension should be present, to prevent particles of molten metal from dropping on to articles at a lower level in the nitriding box and thus produce protection at undesired points. The authors are using a paint of tin oxide mixed with glycerin. The glycerin is an excellent vehicle and decomposes into volatile compounds during the nitriding process, so that the tin oxide can be readily reduced to metallic tin by the active hydrogen produced as a result of the decomposition of the ammonia.

Wear Resistance of Nitrided Surfaces

Test results on wear resistance, based on operation of friction-testing fixtures and a long exposure of surfaces to wear, were reported at length in the paper. Finally conclusions regarding Nitralloy and nitriding follow:

The physical properties of Nitralloy in the un-nitrided condition compare favorably with those exhibited by the best of the structural alloy steels.

All parts should be heat treated before nitriding, to obtain desirable physical properties of the core and to insure proper grain refinement, since the original grain size of the material is not reduced during the nitriding operation.

Nitriding at temperatures ranging from 900 to 1300 deg. F., shows that the depth of case increases, but the hardness decreases, with increase in temperature. It is possible to nitride at a relatively high temperature, 1200 deg. F., for example, to obtain considerable depth of case and then to nitride at a lower temperature, such as 950 deg. F., to obtain the desired hardness.

The presence of decarburization before nitriding

produces a brittle case which is likely to spall or chip. This decarburized layer must be removed before subjecting the parts to the action of the ammonia gas. Strains created by machining and by heat treating of parts must be eliminated, if warping or distortion in the finished articles is to be prevented.

Nitrided articles offer marked resistance to atmospheric, water, and salt-water corrosion. Nitrided Nitralloy exhibits excellent wearing properties, even when tested without lubrication against certain other alloys, notably against nitrided Nitralloy itself, and a special bronze containing nickel.

In view of the many desirable properties possessed by nitrided articles, this subject should prove of increased interest to mechanical as well as to metallurgical engineers.

Many Points Brought Out in Discussion

BASED on a 40-hr. run, one speaker figured that a new box carrying the parts to be nitrided works out at about 10 lb. of material handled for each pound of ammonia used. With an older box, however, more ammonia is required. This condition has given rise to an attempt to find a box in which the surface is sufficiently inert so that it does not absorb ammonia. In general, the ammonia cost works out at about 1½c. to the lb. of work.

Another speaker questioned this latter point. He stated that the quantity of ammonia used is a function of the surface to be treated rather than of the weight of the parts. His experience showed it to be necessary, after a certain period of running, to denitride the boxes and retorts, because otherwise variable re-

sults were obtained. Among his practical results he cited the following:

A charge of 850 lb. (net) of piston pins was subjected to a 30-hr. run, of which 26 hr. was in the furnace, at 950 deg. Fahr. This material was Nitralloy G. The current consumption was 300 kwhr. About 40 lb. of ammonia was used and a hard case was obtained, measuring about 0.010 in. thick. This worked out at about 35 to 40 kwhr. for each 100 lb. of work, and from 4½ to 5 lb. of ammonia for the same output. The cost of power and ammonia totaled 1.2c. a lb. of product, based on power at 1c. a kwhr. and ammonia at 18½c.

Discussing the question of deep drawing dies made of this material, the opinion was expressed that the design of the die has as much as anything else to do with its success. Sharp corners must be avoided if good results are to be obtained.

One interesting example of a nitriding job was brought up in connection with some work by the Carnegie Steel Co. at Homestead, Pa. A holding-down nut on the big structural mill was to have its threads nitrided. This nut weighs 5100 lb. It is too big for any nitriding box in the plant and any box which could be built to carry it would be too big for the furnace.

Consequently plates were welded on top and bottom of the nut and the nut itself used as a box, suitable ammonia piping being run through one of the plates. It was found, in connection with the use of this nut, that there must be a perfect fit between the threads of the nut and the threads on which it works, otherwise a high unit concentration of pressure will cause breakdowns.

Nitriding Analyses—Their Physical Properties and Adaptability

IN their paper Mr. Sergeson and Mr. Clark give the range of analyses of the present chrome-aluminum-molybdenum nitriding steels. The physical properties of these analyses are given in detail in regard to both tensile and impact values. Some data on fatigue tests have been added. Mention is made as to the proper quenching temperatures and there is a suggestion as to the amount of stock to be removed for elimination of decarburized surface obtained previous to machining. Many applications which are operating highly successfully are given.

Typical analyses of nitriding steels (Nitralloy) now available commercially follow:

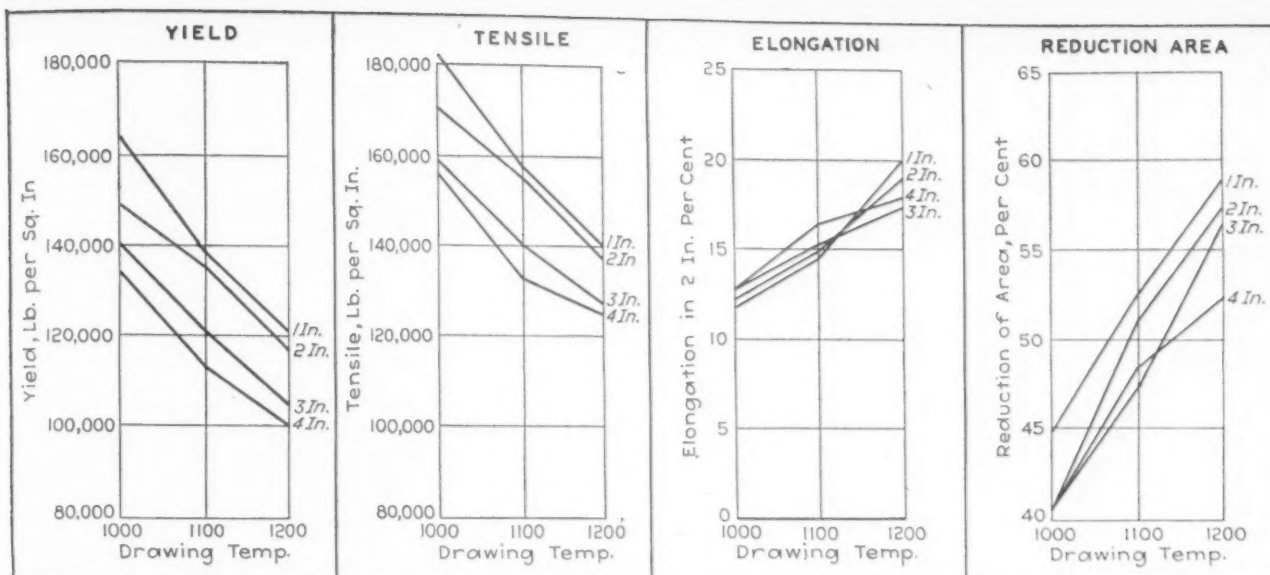
Type	C	Mn	Cr	Mo	Al
I	0.10/0.20	0.40/0.70	0.80/1.30	0.15/0.25	0.60/1.20
H	0.20/0.30	0.40/0.70	0.80/1.30	0.15/0.25	0.60/1.20
G	0.30/0.40	0.40/0.70	0.80/1.30	0.15/0.25	0.60/1.20
High-C	0.55/0.65	0.40/0.70	0.80/1.30	0.15/0.25	0.60/1.20

Fatigue properties of Nitralloy G were explored. Stock of 0.34 per cent carbon, heat treated, in round bars, 1⅓ in. in diameter, was used for tests. Specimens nitrided were given a case-hardening 1/32 in. thick. Tensile and fatigue tests are shown in table.

From these tests, it is evident that, at least in small sections, the nitrided case actually increases the fatigue limit of the steel.

RESULTS OF TENSILE AND FATIGUE TESTS

Treatment	TENSILE TESTS				FATIGUE TESTS		
	Yield Point Lb. per sq. in.	Ultimate Strength Lb. per sq. in.	Elongation in 2 in. Per cent	Reduction of Area Per cent	Stress, Lb. per sq. in.	Number of Reversals	Remarks
As heat treated	74,650	103,300	25.5	62.9	36,000	33,000,000	Did not break
As heat treated	74,550	102,000	25.0	63.4	75,000	40,800	Bar broke
As heat treated and nitrided	83,200	105,700	10.0	12.2	75,000	28,000,000	Did not break
As heat treated and nitrided	83,500	108,700	10.5	12.5	85,000	1,411,000	Bar broke



Change in characteristics with varying drawing temperatures and differing diameters of specimens, all nitrided Nitralloy G.

The experience of the authors as to the adaptability or selection of these nitriding analyses to the machine, automotive and aviation fields dates back but little over two years. In that time there have been many successful applications, many more are still under test, and some few were failures. To give a clearer understanding, the various applications are listed in the paper and illustrations of many are shown.

For best results, these analyses should be used in the heat-treated state, being fully machined before being subjected to the nitriding treatment. Although it has been previously stressed, it is again to be pointed out that, after heat treating, the decarburized surface must be completely removed by machining. In general, a removal of 1/16 to 3/32 in. is sufficient to remove all decarburized area.

Nitriding in Packing Materials and Ammonia

A METHOD of nitriding was described by Mr. Kinzel and Mr. Egan, which consists essentially of packing the work to be nitrided in suitable finely divided materials. These are inert to the reaction and may be non-metallic or metallic. Magnesia, copper and prenitrided nitriding steels are very effective. The nitriding is carried out as usual in ammonia, but less time is required for a given depth of case. Corrosion-resistant cases have been produced by these means in 4 hr.

The packing materials act to give uniform nitriding, making the process independent of the condition of the container and circulation of the ammonia. The process is applicable to both chromium-aluminum and chromium-vanadium nitriding steels and the authors believe it should find ready commercial application.

On nitriding heat after heat on a 20-hr. cycle with the use of magnesia or equivalent packing material, extremely uniform results have been regularly obtained. It is particularly interesting that these results are independent of the type of container used or of the condition of its inside surface. It is further significant that experiments indicate that the type of case ob-

tained when using a packing material is independent of the dissociation of the gas, within very wide limits, so that a careful control of this factor is unnecessary when packing materials are used.

It is expected that the use of packing materials as here indicated will find ready commercial applications due to the following advantages:

Finely divided magnesia, copper gauze, chips or filings, as well as other materials, produce increased depth of case in a given time of nitriding in ammonia, when used as packing materials.

The case produced in 4 hr. in ammonia by the use of these packing materials is corrosion resistant to salt spray.

Uniformity of the process is insured by the use of these packing materials.

Packing materials may be used with equal success on chromium-aluminum or chromium-vanadium steels.

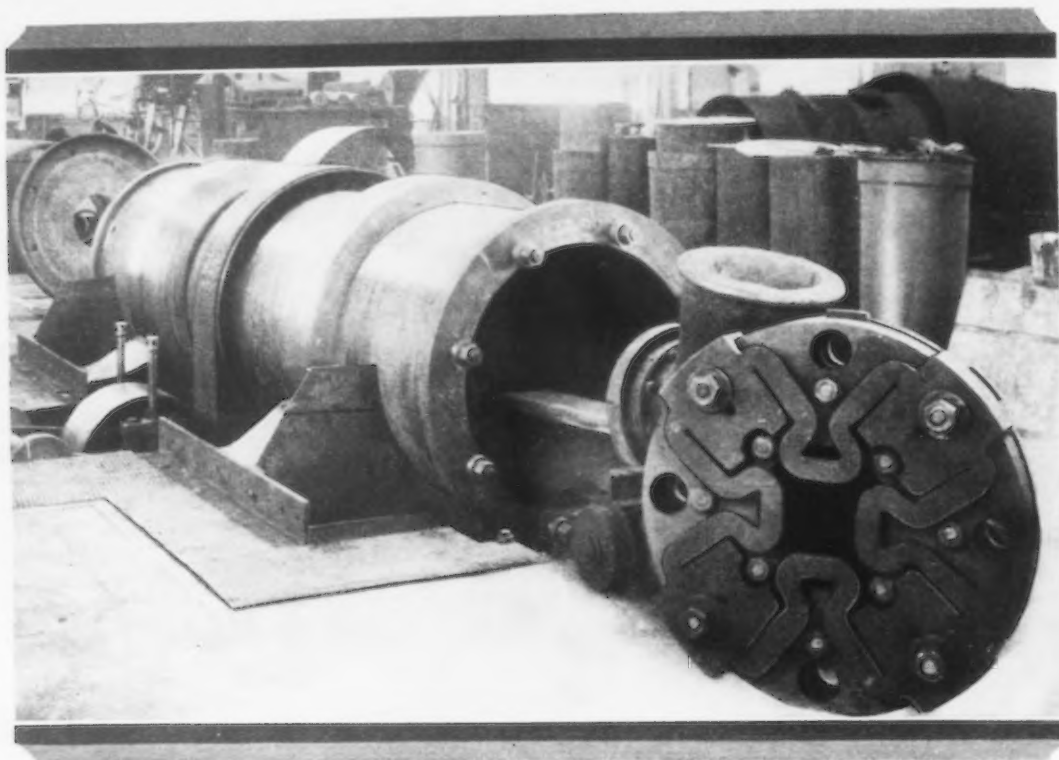
Discussion of Nitriding with Packing

TIME consumed in packing a box with parts to be processed and with packing material, and in bringing such a mass up to temperature and then cooling it again, was thought by one speaker to be excessive for commercial work. He brought out the point, also, that there might be considerable sluggishness in passing the heat through the packing material. Inasmuch as this packing method had been used only in laboratory research, no information was available to show how much of a detriment this factor might prove to be.

Acceleration in the nitriding process through the use of other expedients was referred to by one speaker as a valuable contribution to the art. It was brought out that a relatively low temperature was used in Mr. Kinzel's tests—860 deg. F.—because the investigators believe this to be the optimum temperature for chrome-vanadium steel. They have made comparative tests at the higher temperatures usually employed in nitriding, and find that the results compare very well.

Some of the heats were reported to have been accomplished in 4 hr., to which should be added about 45

(Concluded on Page 1012)



Large Centrifugal Castings Made at Navy Yard

By JOSEPH F. CROWELL

Lieutenant Commander, United States Navy

EMPLOYMENT of centrifugal casting machines for the production of cylindrical castings is nothing new, and yet there are comparatively few foundries in this country in which such machines are in use. As far back as 1915 the New York Navy Yard, Brooklyn, became interested in casting by this method and designed and built its first machine. The satisfactory results obtained with this machine led to the construction, from time to time, of others having larger capacities. A brief description of the latest, which is very much larger than any previously built by the yard, and in fact one of the largest in the country, will be given later on in this article.

As the name indicates, these machines are designed to utilize centrifugal force in the process of molding cylindrical castings. The process consists in pouring molten metal into a rapidly revolving cylindrical mold where it is spread out evenly and compactly against the sides by the action of centrifugal force. The pressure exerted on the metal by this force expels the contained gas before the metal has had time to cool and solidify.

This method has shown itself to be highly satisfactory for the production of certain hollow cylindrical castings, the metal of which must be non-porous, of uniform texture and hardness, close-grained and free from blow-holes or other imperfections. Castings that in use will be required to withstand external or internal pressure, continuous surface wear or a combination of these stresses, should have the above-mentioned physical characteristics.

Examples of such castings include sections of pipe used in the construction of water, gas and oil mains, cylinder liners of engine and pumps, Babbitt metal forming the bearing surfaces of large bearing brasses, and the sleeves for protecting the tail-shafting of marine engine installations.

There are several firms in the United States engaged in the manufacture of pipe whose foundries are equipped with centrifugal casting machines. At the New York Navy Yard the machines are used for a variety of purposes in connection with the building and repairing of naval vessels.

Two types have been developed, known as the "horizontal" and the "vertical" machines. The difference is one of design only and consists in the manner in which the "barrel" is supported on the machine. The barrel is a revolving steel cylinder, in which is placed the cylindrical mold used for making the casting. The axis of the barrel of the horizontal machine lies in a horizontal plane and that of the vertical is upright. Both types are driven by belts and electric motors of suitable horsepower.

In operating, the metal is poured into the mold of the horizontal machine by means of a spout, through a central opening in the cover-plate secured over the end of the barrel. The metal enters the mold of the vertical machine in a similar manner through a central opening in the cover-plate, secured over the top of the barrel.

The original machine was of the vertical type. The barrel of this type is supported by a revolving vertical shaft. The horizontal machine is a development of the vertical and its barrel is supported by, and revolves on, four heavy steel rollers. The latter type is more suitable for general use than the vertical, particularly in cases where the length of the casting is greater than its outside diameter. At the New York

ONE of the largest horizontal centrifugal casting machines in the country, located at the New York Navy Yard, makes castings 14 ft. long and 28 in. in diameter.

There are seven centrifugal machines of different sizes at the Navy Yard.

Molds in larger machines are lined with sand.

Both horizontal and vertical machines have been developed.

Barrel for largest machine is made out of an old 13-in. naval gun.

Several types of ferrous and non-ferrous castings are produced centrifugally, including sections of pipe for water, gas and oil mains; cylinder liners for engines and pumps; Babbitt bearing surfaces of large bearing brasses, and sleeves for tail shaftings.

Navy Yard the vertical machines are used for the manufacture of relatively short castings and billets.

Mold Lined with Sand

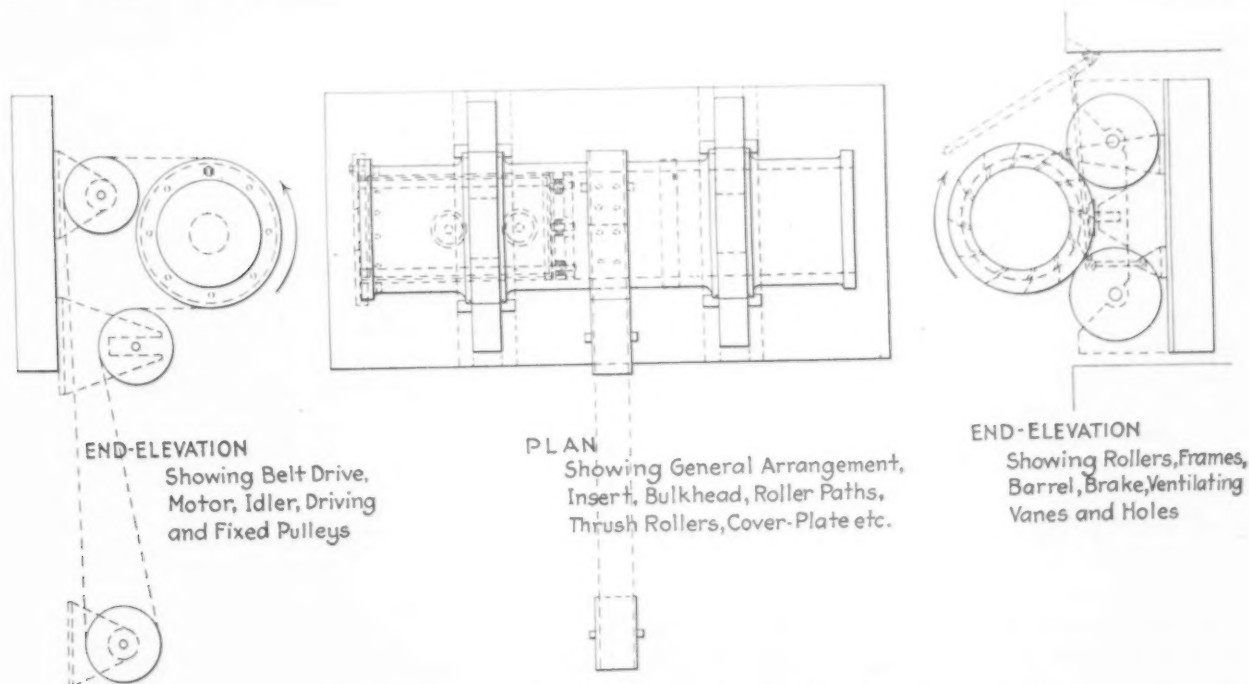
The mold used in the larger machines consists of a hollow steel cylinder lined with sand. It is closed at one end and the inside is made rough by machining circumferential grooves throughout its length for the purpose of making a good holding surface for the sand lining.

Numerous small vent-holes are drilled in the sides of the insert to permit the escape of the gases from the molten metal. Fitted around the outside of the insert, one at each end, are heavy steel rings or hoops. These rings are machined to fit the bore of the barrel with just enough clearance to prevent the

insert from jamming or gripping when it has become heated or when it is being placed in, or taken from, the barrel.

To prepare the insert, prior to making a casting, it is first placed on end with its open end up. A wooden or metal cylindrical pattern, whose length is slightly greater than that of the insert and whose outside diameter corresponds to that of the casting to be made, is placed inside the insert and centered.

Next, moist molding sand is stamped down around



General plan and elevation of the 14-ft centrifugal casting machine

The 14-ft. centrifugal casting machine showing bulkhead and hopper (front) with cover-plate in the background (opposite page)

the pattern until the annular space between the insert wall and the pattern is filled up. This latter operation is accomplished by hand or with a jolting machine, depending upon the size of the casting to be made. Finally, the pattern is removed and the insert with its sand lining is placed in the oven to be dried out and baked, after which operation it is ready.

Two accessories are used for securing the insert in its proper position in the bore of the barrel. These are the cover-plates and the bulkhead. On the horizontal machine there are two cover-plates, one for each end of the barrel, but on the vertical machine there is only one, which is secured over the top. The cover-plates are heavy steel disks having circular openings in their centers and are secured over the ends or top of the barrel by means of stud-bolts and nuts. The bulkhead is a double partition made of two steel disks, which can be secured in any desired position in the bore of the barrel.

Located between these disks is a set of heavy spiral springs which connect the front disk with the rear and permit relative movement of front disk by compressing the springs. Both disks are made to fit loosely in the bore of the barrel. Mounted around the periphery of the rear disk, which is made of heavier material than the front, is a set of jaw chucks which, when set up, lock the bulkhead in the barrel. On the outer face of the front disk is a covering of thick asbestos millboard, which protects the bulkhead from the heat of the insert when the machine is in operation.

Before placing the insert in the barrel, the bulkhead is first secured in its proper position in the bore, which position depends upon the length of the insert to be used. After the bulkhead has been secured, the insert is placed in the barrel, closed end first. It is pushed in as far as it will go without forcing. In this position, the closed end is in contact with the front disk of the bulkhead and the open end of the insert protrudes slightly beyond the end of the barrel.

To be in proper position the insert must be forced in far enough to bring its open end flush with the end of the barrel. To accomplish this, the bulkhead springs must be compressed a corresponding amount, which is done by putting on the cover-plate and setting up on the nuts until it comes in contact with the end of the barrel. In this position the insert is held securely between the cover-plate and the front disk of the bulkhead by the action of the compressed springs.

In addition to holding the insert in position, the cover-plate prevents the molten metal from flowing out of the mold, so that it really serves as part of the mold while the machine is in operation. To protect the inner face of the cover-plate, it is covered with thick asbestos millboard.

Centrifugal Machines Used at the New York Navy Yard

No.	Type	Max. Dimensions of Castings Produced		Use
		Dia.	Length	
1.	Vertical	10 in.	11 in.	General
2.	Horizontal	8 in.	15 in.	General
3.	Vertical	24 in.	18 in.	General
4.	Vertical	24 in.	18 in.	General
5.	Horizontal	10 in.	16 in.	Babbitting bearings
6.	Vertical	12 in.	10 in.	Babbitting bearings
7.	Horizontal	28 in.	14 ft.	General

In making small billets or castings of brass or other copper alloy, the inserts used are called "chills." The walls of these inserts are not perforated and, as they are not lined with sand, their inside surfaces are smooth.

Casts Babbitt on Inside of Bearing Brass

In casting Babbitt metal on the inside surface of a bearing brass, the bearing

brass itself forms the insert. The upper and lower halves of the bearing brass are bolted together and then centered and secured in the barrel by means of set-screws.

Of course the size of the bore of the barrel of any particular machine limits the size of the casting that can be made in that machine. Within this limit, however, castings of different lengths and diameters can be made. The same insert serves to make castings of different diameters, but usually, when a change in length is involved, a different insert, corresponding to that length, is used. The table lists the centrifugal casting machines in operation at the New York Navy Yard, Brooklyn.

Latest Machine One of the Largest

A brief description of No. 7 machine, which has recently been completed, follows. It was designed and built entirely by the personnel of the New York Navy Yard. The accompanying rough sketch is not drawn to scale and is intended to show only the general features and arrangement of the apparatus.

The machine is of the horizontal type, of rugged construction, and weighs many tons. It is installed in a rectangular concreted pit about 3 ft. deep, having an extension or spur on one side to accommodate the driving motor and belt. The bed-plate, upon which the machine is supported, is a heavy slab of old armor-plate embedded in the concrete floor of the pit.

Two heavy cast steel frames, one on each end, extend transversally across the top surface of the bed-plate. The frames are similar in design and each supports two heavy steel rollers which in turn support the barrel and permit its rotation. The axles of the rollers turn in large roller bearings housed in the frames.

Barrel Weighs Nearly 11 Tons

Underneath the barrel, near one end, are two thrust rollers. The vertical shafts of the thrust rollers are mounted on ball bearings housed in brackets secured to the frame supporting that end of the machine. The faces of the thrust rollers are beveled and engage the sides of the large collar which forms the roller path for the rollers supporting that end of the barrel. The function of the thrust rollers is to prevent any longitudinal movement of the barrel when the machine is in operation.

The barrel of the machine weighs nearly 11 tons. It was turned out in the machine shop of the New York

(Continued on page 1047)

Successful Industrial Selling Depends on Six Principles

DEPARTING from its long established practice of confining its program to the presentation and discussion of the latest developments in the heat treatment of metals, the American Society for Steel Treating introduced a sales session at its twelfth annual convention at the Hotel Stevens, Chicago, last week. The fact that close to 700 members attended the session, two-thirds of whom were salesmen, is ample testimony to the success of and the interest in this innovation. It is safe to say that this feature proved so popular that it will be incorporated in future programs.

R. C. Borden and Alvin C. Busse, assistant professors of English and public speaking at New York University, presented a dramatized lecture on selling which at times took the form of a dialogue between a salesman and his prospect. This served to drive home forcefully the fundamental factors to keep in mind in attempting to win a business argument.

The first of these is for the salesman not to try to do all of the talking himself. If he insists on ignoring this rule, he will find that his prospect soon ceases to follow carefully what he is saying, maintaining only a semblance of attention. Under this shallow exterior, the prospect's mind becomes more and more preoccupied with the arguments on the other side of the question. Held back by the salesman's continued verbosity, these unexpressed arguments gradually assume in the prospect's mind an exaggerated importance, and finally if the salesman talks long enough, the prospect will show irritation and resentment, which are ruinous to the salesman's chances of winning. It is the unanimous testimony of keen observers that these results almost invariably follow the argumentative policy of doing all the talking.



HOW TO WIN A BUSINESS ARGUMENT

Don't try to do all the talking yourself.

Don't interrupt your opponent.

Avoid an argumentative attitude that is belligerently positive.

In the first half of an argument, inquire rather than attack.

Restate clearly and vigorously in your own words the gist of each argument your opponent advances — as soon as he advances it.

Identify your main argumentative attack with one key issue — then stick to that issue. Don't digress.

"If you would win arguments, be a good listener first and a good talker second. When you make a comment, take care that it is brief and to the point," declared Professor Borden. "After your opponent has replied—and let him take as much time as he pleases in making this reply—advance another brief, sententious comment. Then listen some more. By a thoughtful expression and intent general demeanor, encourage your opponent to continue speaking. Make him realize that your listening is real, appreciative.

"The tactical advantages of this procedure are enormous. In the first place, it assures your opponent of your entire fairness in the dispute and predisposes him to a like attitude. If you are willing to listen to him, he is willing to listen to you. In the second place, it leads your opponent to deflate automatically any 'hobgoblin' arguments in the

back of his mind which loom large merely because they are hazy and blurred."

Salesman Should Not Interrupt Prospect

A salesman should not interrupt his prospect, stated Professor Borden. He emphasized that interruptions are risky and almost invariably irritate, no matter how cleverly effected they are. He continued: "You're not trying to convince a neutral third party that you are the cleverest debater. You are trying to get your opponent to change his opinion. This task must be undertaken with circumspection. It requires good psychology, courtesy, tact, strategy—even more than it does a logician's cleverness or a debater's fluency."

Professor Borden warned his listeners to avoid an argumentative attitude that is belligerently positive in soliciting business. "In your manner of delivery be unvaryingly suave, in the phraseology of your as-

sessions unvaryingly moderate. When you want to emphasize a point, do so by increasing the earnestness of your tone, not its volume—by wording your statements with greater precision, not with less moderation. If your opponent is an average human being, he will react to these tactics by imitating them; that is, he, too, will try to be suave in manner and conservative in statement." Professor Borden pointed out that arguments are seldom won by belligerent speakers, opinions are rarely changed by overpositive affirmations.

Prospect Should Be Led to Talk Himself Out

The only opening move in an argument consistent with good strategy is inquiry, according to Professor Borden. Therefore, a salesman should lead the prospect to tell him first why he thinks he is right. By getting the prospect to do this, the salesman induces him to discharge practically all of his heavy ammunition during the first and psychologically indecisive half of the argument. During the second half, the prospect has no other recourse than to listen to the salesman with the same inquiring sympathy, receptiveness and spirit of concession which the salesman accorded him. This strategy does not end there, however, for the prospect has betrayed the reasons he considers basic and those which he regards as immaterial. He probably has given the salesman the opportunity to pin him down to one key contention on the validity of which he is willing to stake everything. In short, by the time the salesman is ready to launch his main attack, he has all the information necessary to direct and concentrate that attack with maximum effectiveness.

Another fundamental principle which the salesman must remember is to restate clearly and fairly in his own words the gist of each argument advanced by the prospect just as soon as he advances it. If this is done, the salesman gives the prospect incontrovertible evidence that he appreciates the full significance of the latter's ideas and thereby removes the impulse on the part of the prospect to restate his case, fearing that

he has not made clear his position. This method aids in making the prospect "talk himself out" quickly.

"Before launching your main attack in the concluding phase of an argument," said Professor Borden, "persuade your opponent to concede the decisive, overshadowing importance of one key issue. Formulate this issue carefully and with the greatest possible clarity. Get your opponent to agree, if possible, on its exact wording. Then stick to it through thick and thin for the remainder of the argument. Don't digress. Should your opponent introduce a point not relevant to the key contention, or not essential to it, do one of three things:

"(1) Waive its consideration by pointing out its apparent irrelevance or unessentiality.

"(2) Concede its truth—either unconditionally or for the sake of argument.

"(3) Postpone its consideration for the time being.

"Too many cooks spoil the broth; a multiplicity of issues spoils the argument."

The lecture was followed by a lively discussion in which many members participated. It was agreed that no principle meant anything in selling unless it could be intelligently applied by a man who knows human nature. Moreover, selling on the basis of friendship is not only proceeding on a false basis, but is likely to bring poor results in most cases. The better a salesman knows a man, the harder it is to sell him. The point also was brought out that engineering colleges should pay some attention to turning out men who, in addition to their technical equipment, possess some knowledge of human nature.

Donald G. Clark, director of sales, Firth-Sterling Steel Co., McKeesport, Pa., chairman of the sales session, remarked during the discussion that in the early days of the society there had been opposition to having salesmen participate in its meetings, but that this attitude had been reversed in recent years because sales work has become so technical that sales engineers are now required.

Soundness in Die Castings

DIE castings were discussed at the recent meeting of the Institute of Metals (British). E. V. Pannel, in connection with the correct placing of the gate in the die-casting operation, said it is useful to remember that the priming of the gate with oil and blacklead reveals the swirls and eddies caused by an improperly-placed gate. Aluminum-copper alloys give good die castings. The presence of magnesium increases shrinkage and gives rise to difficulties in finishing. For these reasons die casters usually steer clear of this metal. Nickel, on the other hand, gives good results. An excellent finish is secured on the castings and, moreover, the life of the mold is prolonged.

A. H. Munday stated that the industry itself has become thoroughly tired of trying out various complex alloys and has fallen back on ordinary cast iron. Difficulties with regard to unsoundness have been experienced by all. Nevertheless, many thousands of

serviceable die castings are produced, which, although not absolutely sound, are relatively quite sound. It was generally agreed that it is practically impossible to obtain any casting perfectly sound. Dies should, therefore, be designed in such a way that the unsoundness is located, either in a head, which could be subsequently cut off, or in a relatively unimportant portion of the casting.

Molten steel may be refined in an electric furnace at a cost of 130 kwhr. per ton and cold steel at 500 to 900 kwhr., according to Albert Levasseur in the Bulletin of the Société Française des Electriciens. He regards the electric furnace as not well adapted to decarburizing, whereas it is admirably suited to deoxidation and desulphurization, in which work the consumption of current is reduced to a minimum. It is admittedly good for the manufacture of special steels.



Associated Press Photo

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NO wonder New York City is the world's greatest structural steel market! From the dizzy heights of the new Empire State Building, which is rising to 80 stories at Fifth Avenue and Thirty-fourth Street, the structural steel worker and the camera man look down on the midtown section of New York, which has undergone a tremendous development in the past few years. In the background is the new Chrysler Building, which must soon take second place to the Empire State Building as the tallest in the world, and even the Chrysler Building dwarfs many of the 40 and 50-story buildings which surround it.



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BOOK REVIEWS



Life Expectancy of Physical Property, Based on Mortality Losses. By Edwin B. Kurtz, E.E. 205 pages, 5½ x 8¼ in.; illustrations, 90; tables, 60. Published by the Ronald Press Co., New York. Price, \$6.

This is a book worth several notices; to be read several times and preserved for frequent reference and notation. It aids whoever studies it to learn how long any given physical property will be serviceable; at any time how much longer an item can be expected to last, and what replacements will be needed each year.

The principle outlined is the application of the method of human life mortality tables to physical property conditions; telling what data are necessary, and how to use them. The author gives the reader three methods: tabular, graphic and algebraic, to obtain the desired results; thus either developing the one from the others or checking each by the other. The concrete examples from which the specimen tables and charts are made are in 52 groups of about 20 lines, giving one an excellent idea as to what and how many data are required in any line under consideration.

The chapters consider respectively Mortality Data for Equipment and Machinery, Methods of Compiling Mortality Tables, Development of Mortality Curve Types, Frequency of Curves of Replacement of Original Units, Equations of the Seven Type Mortality Curves, Average Life, Expectancy and Probable Life, and Annual Renewals.

The most important chapter is perhaps the third, on the Development of Mortality Curve Types, which groups all curves according to types of property, those with slope between 30 and 70 points, and with slope between 15 and 85 points, those with slope between 20 and 80 points, minimum life, and slope between 25 and 75 points, the latter being chosen as the most representative and useful, and being expressed in terms of the per cent of average life between the two points.

Classification of 52 groups representing various kinds of physical property resulted in the formation of seven distinct groups, with the numbers very unequally distributed, as shown in Table 20. Very strangely, it was shown that there was a striking similarity between five mortality groups of telegraph poles, each of the five groups of which was treated with a different preservative.

An excellent method of plotting replacements of original units is shown in Fig. 43, the main portion of which is devoted to locomotives, and shows the per cent of survivors of given ages, also the survivors of ages shown on the mortality group.

(The seven type groups are not to be confused with those representing the seven most frequent of the 12 types of the general equation of frequency curves.)

Calculations based on the curves are as a rule complicated, and many involve differentials.

The significance of the seven frequency equations is not only in the fact that they provide means for graduating the seven frequency curves, but because they permit smoothing out irregularities, and give more reliable curve results; and since the mortality curves are derived from the frequency curves, they are graduated in the same way. Further: the fact that the equations fit the original data remarkably well establishes the fact that the observations respecting the life of physical property can be classed as natural phenomena, and must be a most important conclusion.

The improved method of calculating constants for the seven mortality curves gives results based on the fact that death is likely due to two existing causes: chance without any previous disposition to death, and deteriora-

tion or increased inability to resist destruction, the first being some constant, the second increasing geometrically.

Comparison of the mortality curves of the seven types with the values obtained from the equation

$$y = 149.2^x \times 1.035^x \times 0.6702^{1.137x}$$

shows remarkable coincidence:

Table 37 gives very thoroughly the average life, median and modal year, and maximum life, and the ratios of average life to all three quantities. This table shows the values for the average of the 52 ratios, average life, median year and modal year to maximum life to be 0.5575, 0.551 and 0.564 respectively; showing that mortality curves are not true probability curves, as their units have not an equal chance of being replaced early as well as late in life, but have a better chance of staying in service during the early years; so that instead of a heavy "infant mortality" there is apparently a reduced hazard, agreeing with experience.

Probable life at a given age is defined as "age plus expectancy at that age."

Fig. 76 shows the method of plotting expectancy and probable life on mortality charts; and Fig. 77 shows the mortality chart of water-works pumps, illustrating the method of plotting expectancy and probable life. Fig. 80 shows the manner of sketching in the probable life curve from estimates of average life, expectancy at average life, and known value of maximum life.

Applied Mechanics. By Frederick N. Weaver. 322 pages, 6 x 8½ in., illustrated. Ronald Press Co., New York. Price, \$3.25.

This book avoids all material properly coming under the head of strength of materials and machine design, although these properly belong under its title. It calls for a knowledge of the calculus on the reader's part, but not of physics. It has the great advantage of giving solutions of the numerous problems both graphically and analytically. The definitions, to start with, are clearly given; and scalars and vectors are properly treated in introduction. Chapter 2 considers concurrent coplanar forces ("forces" having been defined not only in the ordinary everyday use of the word but from the technical point of view of mechanics). There are many and varied problems with their solutions. Chapter 3, taking up parallel coplanars, is followed by one on coplanar forces in general, showing the methods of joints and sections respectively. Three-dimensional problems are taken up under the rather too general heading of "problems in space"; and as the subject of coplanar couples was treated in Chapter 3, non-coplanars are here discussed.

Thus far the general principles having been discussed, machines are taken up (Chapter 6, on the lever, and the wheel and axle—including gears and blocks and tackles). Strangely enough the screw is left out of the discussion at this point, Chapter 7 being devoted to friction. The values of coefficients of friction are meager and too old. In this chapter the wedge is handled *en passant*. The very important matter of friction of driving belts and of blocks and tackles is neglected; a great pity, as most hitherto published material is misleading.

Chapter 9 considers kinematics of curvilinear motion and rotation (and incidentally does not distinguish between rotation and revolution). In Chapter 10 we have the kinetics of plane motion, with the very practical problem of banking tracks as a sequence to the treatment of the conical pendulum. The author very properly uses the expression "tangential inertia" force instead of "centrifugal"

gal." The important subject of running balance is very badly, because too generally, handled. A good opportunity for illustrating the only true way of balancing pulleys and flywheels—on a vertical cockhead—is here afforded but not taken advantage of. "Work," "energy" and "force" are not sufficiently defined and differentiated.

In the appendix the loaded couple or suspension bridge is the subject. The statement that the curve of the cable approximates the parabola is not quite exactly enough stated; as for a given height and span the center radius at the lowest point is a little greater—that is, the curve is flatter—than with the parabola, the approximation being only because in the case of the suspension bridge the weight per length unit of the chain is greater at the center of the span than near the points of suspension, sinking the catenary in the center.

Especially on account of the problems this book is valuable.
ROBERT GRIMSHAW.

Blueprint Reading. By Joseph Brahdly. 194 pages, 6 x 9 in., illustrated. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, \$2.

This book is a revision of one that appeared under the same title, and by the same author, in 1923. It is designed to give machinists and others employed in the mechanical trades an understanding of the principles of projection as applied in mechanical drawings, and the interpretation of shop blueprints. It is well illustrated, and the drawings appear in white on a blue background, thus resembling blueprints. The illustrations are well chosen to lead the reader gradually from simple to more difficult subjects, and the text is clearly written. At the ends of chapters are given exercises to be drawn and series of review questions. The exercises to be drawn are simple but they bring out clearly the principles it is aimed to impress on the readers' mind. However, there is no instruction given on the instruments required to make the drawings, nor on their use. It seems to have been the thought of the author that the readers have had some training in the use of drawing instruments or that an instructor will be available to supplement the instruction given in the text. Notwithstanding this apparent weakness, the book will be found valuable as a text for home reading and class use.
A. B. CLEMENS.

The Iron Ores of Lake Superior. By Crowell & Murray, Inc., Cleveland. 332 pages + viii, 6 x 9 in., with original maps of ranges. Penton Press Co., Cleveland. Seventh edition.

Since 1911, when the first edition was published by Benedict Crowell, C. B. Murray and their associates, new and revised volumes of this highly valued handbook of the Lake Superior iron ore industry have appeared at three-year intervals. In each of these volumes, as in this one, data have been given concerning every iron mine on Lake Superior, whether active or idle—operating organization, character of ore, method of mining, shipments by years, etc. The history of the various iron ranges has been told, with details of their development, their geology and mineralogy, and the methods employed in valuation, analysis, sampling and shipment. Tabulated statistics, with charts, of production, freight rates, average analyses by years, prices and dock equipment, make up a complete record of the Lake iron ore industry from the beginning.

In the present volume the special articles include: "Iron Ore Reserves of the Lake Superior District," by M. C. Lake, geologist, the M. A. Hanna Co.; "Manganese," by Carl Zapffe, manager of the iron ore properties of the Northern Pacific Railway Co.; "Mining Practice in the Lake Superior Iron Ore Region," by C. F. Jackson, U. S. Bureau of Mines; "Economics of Iron Ore Beneficiation," by C. P. McCormack, and "Preparation of Cargoes at the Mines," by E. R. Bayer, chief ore grader, Minnesota district, Pickands, Mather & Co. All the above are creditable contributions to the seventh edition, but we take space for further reference to two of them:

Mr. Lake puts the reserves of merchantable iron ores—those of a grade now being accepted by consumers—as of Jan. 1, 1929, at 1,242,059,884 tons for Minnesota, 169,430,407 tons for Michigan and 23,000,000 tons for Wisconsin—a total of 1,434,490,291 tons. Taking the average consumption of the past nine years as a basis, he finds this would mean approximately 28 years' supply; but projecting the consumption curve 10 years ahead, with the yearly rate about 61,000,000 tons, gives a life of about 23 years. Mr. Zapffe's special enthusiasm over the part the manganiferous iron ores of Lake Superior will play in the future of the domestic ferromanganese industry is already a matter of record. In a contribution last year to the transactions of the American Institute of Mining and Metallurgical Engineers he showed great faith in the ultimate application of the Bradley process to the production of high-grade manganese ore. In his article in the volume before us he counts much on the development of the process to a commercial basis by the sintering of the manganese hydrate precipitated and the iron ore produced by magnetic concentration. "With the sinter containing 68 to 72 per cent manganese and perhaps not more than 2 per cent of silica and iron, a product is made which has a very high market value. . . . With an ample supply of crude material, for which there is no other use, and available along the present lines of rail transportation, and shippable by water to Great Lakes ports where furnaces are close at hand, it seems almost inconceivable that the Bradley process will not be put into practice."

Kempe's Engineers' Year Book for 1930. Morgan Brothers, Ltd., publishers, 28 Essex Street, Strand, London, W. C. 2. 3000 pages; 3000 illustrations. Price, 31s. 6d., net.

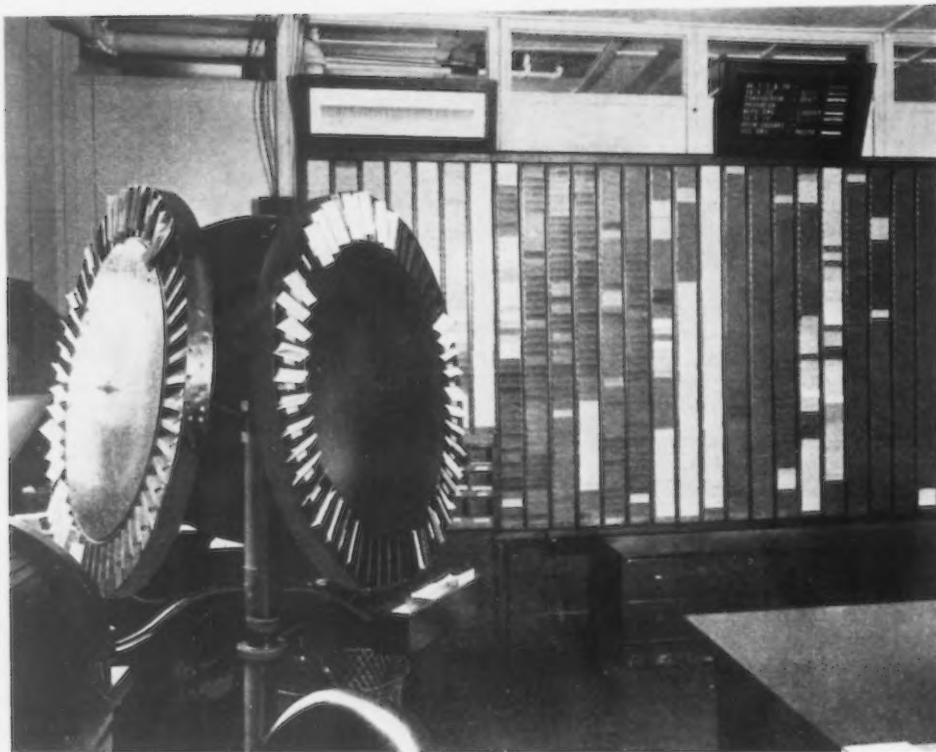
Combining in one volume what American engineers expect to find in several, this thirty-seventh annual edition of Kempe's Engineers' Year Book covers modern practice in civil, mechanical, electrical, gas, marine, mining and metallurgical engineering. It is divided conveniently into sections and has a 75-page index, making it easy to find any topic within its scope.

Its very volume and coverage makes it difficult to give it adequate notice within brief scope. It is divided into 47 sections, and appendix, each section being contributed or revised by an acknowledged authority on the topic covered. General editorship was under the eye of the editor of *Engineering*, London.

Not only does it cover the features which we are accustomed to regard as strictly engineering subjects, but it goes into details of building and road construction and the designs of certain types of machines to a far greater extent than is customarily found in American engineering handbooks. Consideration of railroad rolling stock, flour, cotton, oil and sugar mills, the use of the atmospheric wind for production of power, and methods for computing depreciation of plant—all contained within the work—will give an idea as to the extent of its scope. Refrigeration on shipboard, raising of water from deep wells, filtration, diving, lighthouses, feed-water softening—these are merely samples of what may be found in this all-inclusive work.

As a single volume covering the whole field of engineering and its allied topics, this apparently leaves little to be desired.

Progress in structural steel welding is comprehensively reviewed in a 32-page booklet just issued by the Westinghouse Electric & Mfg. Co., East Pittsburgh. Subjects treated include strength of welded joints, design data, test and inspection data, building codes, estimating cost and bridge specifications. Numerous illustrations show progress in the application of structural arc welding; discussion of possible developments in this field rounds out the publication.



The machine and work control department. Production is controlled by cards placed in metal pockets on the wall board and by the control wheels which have a card pocket for every machine in the plant

Production

By F. L. PRENTISS

*Cleveland Editor,
The Iron Age*

THE production control system used by the Cooper-Bessemer Corp., Mount Vernon, Ohio, maker of gas engines and air compressors, is not only highly sensitive but has some unusual features. In addition to work control boards, production control wheels are provided having a card pocket for every machine in the plant. Each card shows what is being done on a machine at a given time. When an operation is completed, the card is transferred to the pocket representing the machine that does the next operation.

Advantages claimed for the control system are that it relieves the foremen of responsibility in selecting work to be put on a machine and provides a flexibility in routing, easily enabling the planning department to switch from the manufacture of one part to another, putting ahead the one that is more urgent and thus making it possible to maintain shipping dates.

Two Control Tickets and One Work Card

When a stock production order is issued, the planning or machine and work control department makes out a ticket (Card A) bearing the order number, name of the piece, number of pieces to be made and the departments in sequence of operation in which the work is to be done. The name of the operation is

indicated by initial letters of machines. This ticket is put in a metal slot on a control board that covers two sides of the planning room. Cards of different colors are used indicating whether the part is an engine or compressor and for different sized machines. Every morning, cards for different jobs finished during the preceding day are removed from this control board.

A machine shop order or work card (Card B) is also made out, on which is listed the data shown on the control board ticket and also the pattern number, material and time set for the work in hours and tenths of hours. The next operation and the department in which it is to be done are also listed, and space is provided for any special instructions.

Attached to this card is a pink duplicate. Both the card and duplicate go to the dispatch room in the shop, together with similar sets of cards for the succeeding operations, there being one set of cards for each operation. These cards are filed numerically in the dispatch room, where they remain until the job is finished.

The cards that are filed in the pockets in the material control wheels (Card C) carry the same information as that on the control board tickets and in addition the estimated time for each listed operation. These are white cards about 3 in. square.

OF outstanding interest in the production control system of the Cooper-Bessemer Corp., Mount Vernon, Ohio, are four control wheels. Each wheel has 52 pockets, there being separate pockets for all machines. The card in any one pocket shows the work that is being done on the machine that the pocket represents. The wheels thus provide a record of the operations that are under way on every machine in the plant.

Control Wheels

Feature Plant Management

Machine shop orders that the planning department has sent to the dispatch room are issued to the foremen on direction from the planning department by means of a Telautograph. When an operation is finished the foreman returns the machine shop order to the dispatch room and the card is "clocked," indicating that the work is done. Then the man in the dispatch room through the Telautograph tells the planning room that the operation is completed and the planning room tells him what machine order is to be given to the foreman next, from the orders that are on file. Both the original and the pink duplicate order are given to the foreman. The pink card accompanies the work to the succeeding operation before being returned to the dispatch room. After the operation is completed, the original machine shop order goes to the cost department and the pink duplicate is returned to the planning department.

There are four control wheels each having 52 pockets, there being a pocket for every machine. The card in any one pocket shows the work that is being done on the machine the pocket represents. With this system there is a record in the control wheel of the work that is under way on every machine in the plant. When the pink duplicate machine shop order is returned to the planning department, the ticket in the control wheel is moved to the pocket representing the machine which does the next operation. After the dispatch room notifies the planning department that the job is completed, the card is removed to a filing box.

Work sheets are made of every drawing, showing the

name and number of the drawing, name of piece, material, routing, time of operation and how much is to be done in each operation. Duplicate copies of each of these work sheets are filed in convenient cabinets located at seven stations throughout the plant.

The machine tools in the plant are all general purpose machines set up for special operation. An analysis of each job is made and an estimate is prepared of how many pieces are required for each order, how many are likely to be required in a year and how many additional pieces it is advisable to make depending on the length of time required for the machine set-up. If the set-up takes considerable time it is in the line of economy

23-6086-6-29

MACHINE SHOP ORDER

Dept. No. E-6 Mch. No. BM

Order No. S.O. 69132

Name Cylinder Head

Dwg. No. HA-1039 Item A

Patt. No. HHR-7201

Material SS

No. of Pcs. Req. 5

Operation No. 1 Name BM

Est. Time 3 Hrs. 5 Tenths

Next Op. VD Dept. E-6

SPECIAL INSTRUCTIONS

B

69152

5 Cylinder Heads

6 EM 6 VD 6P

HA-1059

A

A

S. O. 69132

5 Cylinder Head

6BM 6VD 6P

5.5 2.0 1.5

HA-1059

MHB-1201

C

Cards A, B and C are forms used as referred to in the text



The routing and machine card checking department

to make more parts than needed for the order, perhaps enough for a year's supply.

After this analysis is made the planning department designates every operation on each piece and assigns the work to some particular type of machine. The machines are all classified by numbers, and the parts that are to be made are listed.

Data are compiled on a machine load chart, which contains a record of the machine number, the number of pieces for each unit, rate, time of making the piece, etc. These data are transferred to other load charts, on which every machine is listed. One chart shows the number of hours that will be required in building

a certain number of compressors and another the time required for building a certain number of engines. These two charts are merged in a third chart, which shows the number of hours on a certain number of units and number of hours' work for each machine.

The object of these load charts is to indicate which machines are loaded, which will require over-time operation and which will require night work. If the hours required in a month on any machine are greater than the total hours in the month, working with both a day and night shift, the necessity is indicated of purchasing an additional machine or placing a contract with an outside shop for some of the parts.



The material control department in which all rough and finished material is controlled and a continuous inventory is kept of all parts

Lost-Time Accidents in Metal Industry

Decreased by Safety Work

SAFETY experiences of the metals industry in recent years has revealed a steady decrease in number of lost-time accidents, accompanied by a sharp increase in their severity, according to E. R. Rose, safety director Republic Steel Corporation, Youngstown, in a report before the Metals Section of the National Safety Council, meeting at Pittsburgh during the week of Sept. 29. Mr. Rose pointed out that the accident frequency rate of the steel industry for 1929 was 19 per cent less than in 1927, while the severity rate was 32 per cent higher. He attributed this increase in severity to a rise in fatal and permanent injuries during the last three years. Rates for temporary disability accidents have steadily decreased.

Distribution of the severity rate for steel plants in 1929 showed that 58 per cent of days lost were due to fatal accidents, 30 per cent to permanent disabilities, and only 12 per cent to temporary injuries. This suggested the question: Is the steel industry focusing too much attention on minor accidents and not enough to conditions providing permanent and fatal injuries? Distribution of the severity rate for the entire metals industry showed that fatal accidents in 1929 represented 47 per cent of total time lost, permanent injuries 35 per cent, and temporary disabilities 18 per cent. Analyses of the safety records of the various divisions of the metal industry, with further sub-division of the steel industry, are shown in the accompanying tables.

Responsibility of the Foreman

The responsibility of foremen in preventing plant accidents was emphasized by F. J. O'Connor, welfare superintendent, E. I. du Pont de Nemours & Co., Penns Grove, N. J. Mr. O'Connor pointed out that, while production has always been the principal object of the foreman, the safety of workmen is just as important a means to that end as low costs, plant layout, etc. In recent years, safety has been recognized as an integral part of managerial responsibility, and the foreman as the management's representative in production must be made to realize his obligations.

Considerable discussion arose over Mr. O'Connor's paper, with regard to the methods used for training foremen along safety lines, and it was revealed that a number of the larger companies represented have incorporated safety courses in their estab-



SOMETHING of the spirit of the National Safety Congress held in Pittsburgh during the week of Sept. 29, was embodied in the "welcome" poster issued by the Carnegie Steel Co., Pittsburgh, a pioneer in the safety movement. The poster depicts Pa Pitt rushing down the street with the key to the city in one hand and the other prepared for a hearty handshake. The "Stay Alive" slogan of the Congress is prominently displayed.

lished foreman training schools. In the plants of the American Rolling Mill Co., Middletown, Ohio, the foreman training course boosts the foreman to managerial capacity, and he is permitted to offer suggestions as to how he would run the plant if manager. This training is extended to every man in the organization who has responsibility for directing any part of the operation and has resulted in encouraging reduction in accidents.

Safety and Production

Pointing out that many industrial plants have never learned to take the slogan "Safety First" literally, James H. Maguire, works manager Haynes Stellite Co., Kokomo, Ind., stated that there are still managers who believe that safety and production do not go hand in hand. "They are afraid," he said, "that if too much care is taken, production will be slowed up; they are afraid that if machines are guarded too closely the speed of operation will be hindered. But they discount the greatest factor in production today—the human element."

"A great deal has been said against

guarding machines to a point where the guarding has interfered with production," Mr. Maguire went on, "but I have never known of a machine guarded to insure its safe operation where the drop in production on the machine interfered with profit. Recently, the problem of guarding a punch press in a factory arose. Engineers were unable to design a guard that would not interfere with production. The manager went to the foreman of the department, laid before him all the proposed guards that had been designed and told him that it was up to him and his men to design a guard that would make the operation of the machine absolutely safe and yet not interfere with production. In three days the foreman returned to the manager with a perfectly safe guard that not only would not interfere with production, but, rather, added to it because of the safety that the workmen felt while operating the machine."

"If this method of approach is used, there isn't any doubt that thousands of machines now unsafe in our industries could not only be made safe, but production would be increased by the knowledge in the workman's mind that the operation was safe."

"There is no better means of creating good feeling among employees than to show them that their interests are considered to the point where the company is willing to sacrifice money and time to prevent their being hurt. While it is impractical to prove on paper production and profit increases as your accident record becomes better, I know of no case where the promotion of safety hasn't helped the efficiency of the company as a whole."

Mr. Maguire outlined the methods used by his company in starting no-lost-time accident campaigns, stating that precautions were first taken to see that every operation and every machine in the plant is so guarded and laid out as to be as safe as humanly possible. Then safe practices must be taught and everyone's interest enlisted. After the management has done its share it can logically expect and demand that the employees do theirs.

The speaker summed up his arguments with the following convictions: "Safety and efficiency in production go hand in hand; placing safety first does not mean interference in any way with the profitable operation of any business; management must be as fair in its conduct of a safety cam-

COMPARISON OF ACCIDENT* FREQUENCY RATES IN THE METALS INDUSTRY

	1929	1928
Steel plants.....	18.13	17.50
Wire mills.....	20.44	22.94
Railroad equipment.....	21.88	10.62
Machine shops with foundries.....	23.44	19.12
Machine and machine tools.....	28.80	27.12
Miscellaneous.....	29.14	35.45
Bolt and nut.....	34.19	30.21
Tubular products.....	34.52	26.37
Steel foundries.....	51.15	40.05
Gray iron foundries.....	52.37	52.42
Malleable iron foundries.....	59.91	61.66
Structural steel fabricating.....	62.92	46.17
Average.....	22.64	23.90

*Accident frequency rate is defined as the number of lost-time personal injuries per 1,000,000 hrs. exposure.

paign as it would be in a production campaign; it does not weaken a safety campaign to tell the workmen that the benefits are mutual; firm disciplinary measures can be used when required without building up ill will; safety first does not increase manufacturing costs, but actually, by improving the morale and establishing the peace of mind of the workmen, increases ultimate profits."

Safety in Steel Erection

Owing to varying conditions of employment, safety precaution in structural steel erection must lean heavily on the judgment of the superintendent in charge, according to W. J. Hazard, superintendent of erection, Bethlehem Steel Co., Bethlehem, Pa. However, considerable aid may be given the man on the job if all the more important details of policy are decided by the engineering department and passed along for the benefit of the foreman or superintendent. Each individual case should also be supplemented with a general set of safety rules which may be observed in nearly all instances.

Physical fatigue on the part of the workers is one of the most dangerous hazards in steel erection work, and must be carefully guarded against by the man in charge of erection work. The structural steel worker often goes to work in a worn-out condition, and the foreman in charge can guard against accidents which might result therefrom only by a careful building up of the human relation. In New York a steel worker is given a half hour rest before starting to work if he has to climb more than 15 stories, and in

other large centers the use of elevators in transporting men to the working floor has become rather general.

The importance of adequate equipment is great, and it is also essential that the employee must be taught to use the equipment intelligently. With the use of heavier materials in the erection of larger buildings, the work of structural erection has become more highly mechanized, and the foreman requires more careful instruction in the major problems of operation. The overhauling and inspection of equipment is also a foreman's responsibility, and one which is daily growing more complex. Mr. Hazard stated that the Bethlehem company thoroughly inspects all hoisting cable after every job, running the cable off its reel and through an oil bath before rewinding. Cables are never spliced and are graded according to their service and reliability. The No. 1 grade, which is principally new cable, is usually used for hoisting work, No. 3 is never utilized for that purpose. The same holds true in the case of rope, and only unused rope is put to hoisting uses. The use of chain has been largely discontinued for hoisting purposes, not only because of possible breaking, but also because of the slipping of the load. Wire cable is used as much as possible, because it can be inspected visually and weaknesses brought to light more easily.

Mr. Hazard pointed out the dangers of derrick failures and indicated that brakes should be applied to stop a load slowly to avoid danger. He advocated the full planking of the working floor for riveting, pointing out that many States were passing laws along these lines. However, regulations are often ignored, and here again the responsibility of the foreman for seeing that rules are obeyed is preeminent. In closing, Mr. Hazard stated that the steel worker is much more quick to act upon suggestions than definite orders, and that a careful mapping out of procedure and setting of examples will greatly reduce the accident hazard in structural steel work.

Safety Hazards in the Foundry

Accident prevention has passed through the machinery guarding and educational stages in the larger foundries, according to J. W. Beall, insurance commissioner, Ohio Steel Foundry Co., Lima, Ohio, speaking on "Foundry Engineering and Safety." In the smaller companies he said that considerable work remains to be done, which is one of the important responsibilities of the safety movement.

Mr. Beall suggested the following program for reduction of accidents in foundries: "Purposeful elimination of misguiding sentimentalism from accident prevention safety promotion campaigns; charging accident costs against production costs to departments in which accidents are permitted to occur, and discipline." In elaborating on this program, the speaker pointed out that workmen

must be taught that it is better for all concerned to take the necessary precautions in their duties than to take advantage of the various pensions and accident insurance, which are maintained by most large companies. He stated that an employee who was constantly being injured through carelessness, and insisted on blaming the company rather than himself, broke down the safety morale of his entire department and should be eliminated. His final suggestion was that the application of proper discipline in enforcing safety rules would do much more to prevent accidents than sentimentalism in ministering to wants of injured workmen.

Devices for hand, foot and head protection for the foundry worker were discussed by S. W. Doran, personnel

ACCIDENT FREQUENCY AND SEVERITY RATES IN STEEL PLANTS BY DEPARTMENTS DURING 1929

Department	Frequency	Severity
Roll turning.....	3.29	0.66
Coke plants.....	6.98	2.13
Ferroalloys and alloy steels.....	7.98	1.46
General electrical.....	8.47	2.95
Maintenance foundries.....	11.72	1.64
General mechanical.....	12.78	3.46
Transportation.....	13.30	3.14
Forging.....	13.92	0.44
Blooming and billet mills.....	14.28	1.88
Mason department.....	14.59	2.95
Pipe mills.....	16.80	2.56
Blast furnace.....	17.01	3.84
Merchant mills.....	17.95	3.28
Plate mills.....	18.10	2.73
Rod and wire mills.....	18.79	2.68
General labor.....	18.89	3.61
Structural and rail mills.....	19.20	4.54
Fabricating.....	19.86	1.99
Open hearth.....	22.11	6.31
Bessemer.....	25.52	2.80
Sheet and tin plate mills.....	27.90	2.07
Construction.....	32.15	1.74
Seamless tube mills.....	32.20	2.06
Skelp and strip mills.....	33.82	2.74
Not otherwise classified.....	10.86	1.69

superintendent, Pratt & Letchworth Co., Buffalo. Mr. Doran recommended the use of gloves in as many departments of the foundry as possible, particularly by flash handlers and hookers. He also stated that the wearing of gloves was even more important in the finishing department than in the foundry itself, as the hand hazards are greater. As a protection against foot injuries, standard safety shoes were recommended for every employee of all foundry departments. In the Pratt & Letchworth plant safety shoes are compulsory, and the company has had no difficulty in securing 100 per cent operation of this rule. Mr. Doran stated that faulty hooking resulting in falling objects is often the cause of foot injury, and might be largely eliminated if foremen were taught the proper hooking methods. Careless piling on stock piles also increases foot injuries, and the building of ledges on inspection benches has largely done away with another common hazard in this field.

Although goggles and spectacles are naturally the principal defense against eye injuries, particularly in the pouring and cleaning rooms, the speaker indicated that failure to wear such equipment frequently leads to serious eye injuries. Many companies have

COMPARISON OF ACCIDENT* SEVERITY RATES IN THE METALS INDUSTRY

	1929	1928
Miscellaneous.....	0.80	1.04
Bolts and nuts.....	0.81	1.86
Wire mills.....	1.15	1.43
Tubular products.....	1.28	1.81
Machine shop with foundries.....	1.43	1.19
Machine and machine tools.....	1.65	1.53
Malleable iron foundries.....	1.76	1.76
Gray iron foundries.....	2.14	1.34
Railroad equipment.....	2.20	1.26
Steel foundries.....	2.47	1.58
Steel plants.....	2.75	2.07
Structural steel fabricating.....	3.89	3.53
Average.....	2.15	1.68

*Accident severity rate is defined as the number of days lost from accidents (including arbitrary figures for permanent disability and death) per 1000 hrs.

met with difficulty in finding the type of eye protection adapted to its needs, as goggles are said to become clouded in certain operations, while ordinary spectacles do not offer sufficient protection. Quite a difference of opinion arose in the later discussion as to the type most adaptable to foundry needs,

000 man-hours for an average of 1481 hr. per person in 1929. The average accident frequency rate in the 1930 contest was 15.604, an increase of 5 per cent over the 1929 frequency rate. This year 72 units completed the contest with a frequency rate below the average as compared with 19 last

tional Steel Fabrics Division, Monessen, Pa.

Iron Foundries:

Group A—United States Pipe & Foundry Co., Scottdale, Pa.

Group B—United States Radiator Corp., Edwardsville, Ill.

Steel Foundries:

Group A—Pratt & Letchworth Co., Buffalo.

Group B—American Rolling Mill Co., Central Works, Middletown, Ohio. Heavy Machine Shops:

Group A—General Electric Co., Philadelphia works, Philadelphia.

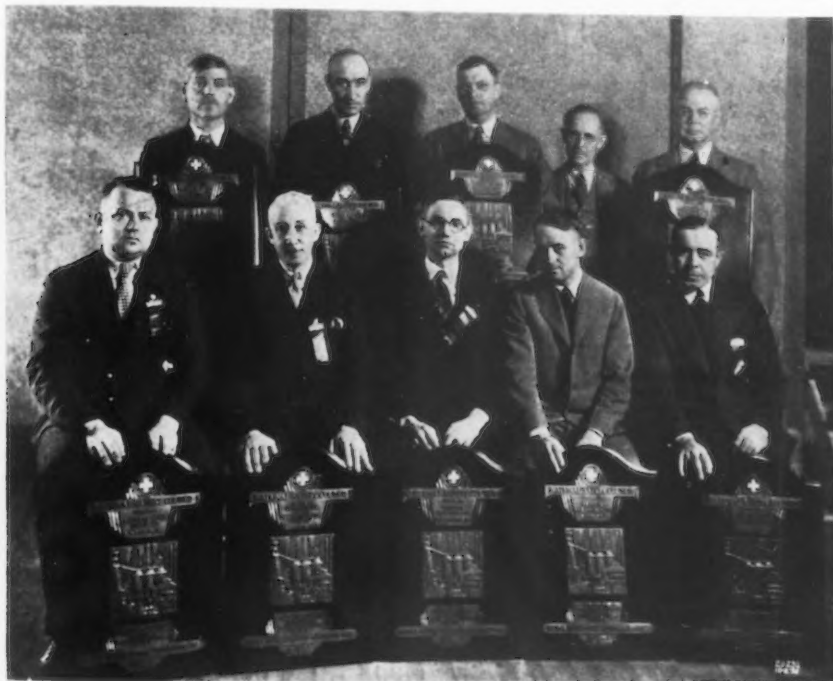
Group B—Bryant Heater & Mfg. Co., Cleveland.

Officers Elected

Carl W. Bergquist, superintendent of public relations for the Western Electric Co., Inc., Chicago, was elected president of the National Safety Council for the coming year; George Sanford, General Electric Co., Schenectady, N. Y., vice-president in charge of engineering; and C. L. Close, United States Steel Corp., New York, vice-president in charge of industrial activity. William H. Cameron will continue as secretary and managing director.

The following officers were elected to serve the Metals Section in the ensuing year: H. G. Hensel, Youngstown Sheet & Tube Co., Chicago, chairman; Frank Lauerman, Republic Steel Corporation, Interstate works, Chicago, vice-chairman, and R. W. Schmitt, Louisville Car Wheel & Railway Supply Co., Louisville, Ky., secretary and news letter editor.

Representatives of Winning Companies in 1930 Metals Section Safety Contest With Bronze Plaques Received



Standing: (left to right) J. R. Byron, American Rolling Mill Co., East works, Middletown, Ohio; C. R. King, United States Pipe & Foundry Co., Scottdale, Pa.; R. W. Hoemsheo, United States Radiator Corp., Edwardsville, Ill.; R. W. Schmitt, Louisville Car Wheel & Railway Supply Co., Louisville, Ky., secretary of Metals Section, and J. W. Woltz, Youngstown Sheet & Tube Co., Hubbard furnaces, Hubbard, Ohio.

Seated: Charles M. Hanko, National Steel Fabric Co., Monessen, Pa.; E. E. Paddock, Weirton Steel Co., Clarksburg, W. Va.; M. A. Gimble, General Electric Co., Philadelphia; S. W. Doran, Pratt & Letchworth Co., Buffalo, and R. G. Adair, American Rolling Mill Co., Central works, Middletown, Ohio.

but no general conclusions were arrived at. Mr. Doran indicated that most of his company's accident problems were attacked by means of extensive educational campaigns coupled with well directed foreman cooperation. Education, he thought, is now a larger problem than mechanical prevention of accidents in the foundry.

Safety Contest Winners Announced

At the closing meeting of the Metal Section results of the section's safety contest covering the first six months of 1930 were announced and bronze plaques presented to the winning companies by C. E. Pettibone, retiring president of the National Safety Council. Mr. Pettibone announced that 152 plants were entered in the 1930 contest, compared with only 34 in 1929. In the companies represented this year 173,783 employees worked 218,411,183 man-hours for an average of 1257 hr. per person, as compared with 58,800 employees working 87,085,-

year, while in the recent contest 10 plants completed the contest without an accident as compared with only one in 1929.

In the contest this year the metals industry was divided into five groups, with the groups further subdivided according to size. Plants with 500 or more employees were placed in Group A in each of the five divisions, with units of 30 to 500 employees placed in Group B.

The following winners were announced:

Steel Mills:

Group A—American Rolling Mill Co., East works, Middletown, Ohio.

Group B—Youngstown Sheet & Tube Co., Hubbard blast furnaces, Hubbard, Ohio.

Rolling, finishing and fabricating plants:

Group A — Weirton Steel Co., Clarksburg tin mills, Clarksburg, W. Va.

Group B—Pittsburgh Steel Co., Na-

Dr. Mathews to Address Steel Treaters

At the first monthly meeting of the New York chapter of the American Society for Steel Treating, Monday evening, Oct. 13, Dr. John A. Mathews, vice-president, Crucible Steel Co. of America, New York, will address the chapter on "Twenty Years' Progress in Tool Steel." The meeting is scheduled for 8 p.m. in the assembly room of the Merchants' Association of New York, Woolworth Building.

Greater Tonnage of Ships Being Built

WASHINGTON, Oct. 7.—On Sept. 1, American shipyards were building, or under contract to build, for private shipowners 251 steam vessels of 478,592 gross tons. This compares with 253 steel vessels of 453,600 gross tons on Aug. 1, according to the Bureau of Navigation, Department of Commerce.

Receiver for the Seamless Steel Tube Co., Appleton, Wis., has been dismissed by court order. The action was started in Circuit Court before Judge Edgar V. Werner. Henry W. Tuttrup was receiver of the company.

Gear Makers Discuss Nitriding and Cost Finding

TECHNICAL standards, cost accounting procedure and case hardening by the nitriding process were outstanding topics at the fourteenth semi-annual meeting of the American Gear Manufacturers Association, held at the Hotel Clifton, Niagara Falls, Canada, Sept. 29-Oct. 1.

In addition to reports at the various sessions by subcommittee chairmen, an entire evening was devoted to technical standards. This session, presided over by A. A. Ross, engineer, General Electric Co., and chairman of the association's general standardization committee, included round table meetings of the various subcommittees, preceded by an address on "A Look Ahead in Gear Standardization and Research," by C. B. LePage, assistant secretary of the American Society of Mechanical Engineers.

After reviewing the 11 years' work of the ten subcommittees of the Sectional Committee on the Standardization of Gears, Mr. LePage said: "While it is true that since its organization the Sectional Committee has completed and secured final approval by the A.S.A. of only two standards, viz.: 14½ deg. composite and the 20 deg. stub involute tooth form systems, I am optimistic concerning the future of its work. It has taken us some time to lay the foundations for this project but I am confident that before very long you will see the structure rising floor by floor."

The decision of the A.G.M.A. committee to designate its multiple letter symbols as "abbreviations" was said to open the way for further activity on the part of reorganized Subcommittee No. 4 on gear nomenclature. In this way, the valuable work on definitions, graphs, etc., completed by the A.G.M.A. committee can now be put into shape for recognition as American standards.

Completion of the revision of the proposed American standard for tooth form of 14½ deg. and 20 deg. full depth involute is expected within the next few months. Release of the proposed American standard specifications for forged and rolled steel gears, which have been revised a number of times, is looked for before the first of the year.

Non-Metallic Gear Practice Revised

The association's non-metallic gear committee submitted a second revision of the A.G.M.A. recommended practice for computing the horsepower of

non-metallic spur gears composed of laminated phenolic materials or rawhide. The revision was accepted; it consists of additions to the table showing the values of the Lewis Y factor, and now includes values of Y for both 14½ and 20-deg. pressure angles.

Tolerances for keyways for non-fitted keys were discussed in connection with the keyway committee's report, submitted by R. B. Zerfey, engineer, Tool Steel Gear & Pinion Co., chairman. Proposed tolerances are somewhat closer than heretofore. The matter is to be submitted to the membership and brought up for decision at the next meeting.

The inspection committee, headed by F. W. England, vice-president, Illinois Tool Works, Chicago, is revising the A.G.M.A. recommended practice; it will suggest two methods of inspection to suit the requirements of both small and large plants.

All gearing nomenclature has been assembled in one report, bringing together for the first time a complete compilation of gearing terms, their definition, etc., for use as a dictionary or reference work. The column for

symbols for gear terms has been left blank for filling in later, and debatable formulas will be omitted and given later in supplementary sheets. D. T. Hamilton, Fellows Gear Shaper Co., Springfield, Vt., is chairman of this committee.

The worm gear committee is collecting load capacity data. W. H. Himes, Westinghouse Electric & Mfg. Co., chairman, outlined the method and some of the results of tests started last January at the Nuttall works. These tests will be continued. Other companies will undertake similar tests; the results will be pooled in the interest of arriving at load capacity formula for worm drives.

Ira Short, Westinghouse Electric & Mfg. Co., South Philadelphia, has been appointed chairman of the herringbone gear committee. M. T. Schumb, engineer, Boston Gear Works, Norfolk Downs, Mass., is now chairman of the library committee.

B. F. Waterman, engineer, Brown & Sharpe Mfg. Co., and president of the association, announced that the next meeting of the A.G.M.A. will be held in Buffalo next May.

Two Sessions Devoted to Cost Procedure

A NEW feature was the devoting of an entire day, Sept. 30, to discussion of commercial topics. A. E. Grover, cost accountant of the National Machine Tool Builders' Association, Cincinnati, spoke extemporaneously on "Costing for Profits," his address taking the form of answers to a series of prepared questions relating to burden, depreciation, labor premiums, engineering costs, administrative costs and inventory.

He was scheduled to speak at the morning session only, but so great was the interest in his views that he was persuaded to carry his discussion through the afternoon session. In addition to a vote of thanks to Mr. Grover, the secretary was instructed to transmit to E. F. Du Brul, general manager, National Machine Tool Builders Association, the appreciation of the A.G.M.A. for Mr. Grover's generous participation in the meeting.

Mr. Grover outlined the uniform cost accounting activities of his association, and from sample cost sheets—a master cost sheet, a standard cost sheet and an estimate cost sheet—explained the standard cost accounting set-up.

In discussing labor premiums, Mr.

Grover said that in the machine tool industry, premiums paid to individual operators for reductions in established performance times are charged directly to profit and loss for the period in which the work is done. Premiums paid to indirect labor are charged in the same way.

Burden or overhead expense should be charged on the basis of: "Per cent of total direct labor hours in each department to total burden in each department, using a burden rate for each machine in those departments where operations are performed on machines and equipment varying in investment and current costs to operate." This is termed the machine center rate.

Depreciation, it was stated, should be calculated on today's reproduction value of the assets, and interest on investment was held to be a proper charge to burden. Administrative cost should be split between manufacturing and sales burden. Cost accountants, it was said, are dropping the third classification of cost, administration expense, and using only two, manufacturing and sales. Engineering costs, their proper allocation, were discussed at length.

Perpetual book inventory was favored; it was said to cost less to maintain the perpetual inventory than to take a physical inventory. Physical inventories of work in process should include factory burden. Obsolete parts should be considered scrap, and writ-

ten off; semi-obsolete parts should take a fluctuating rate according to sales possibilities. The cost of spoiled work, it was held, should be charged either to the individual who spoiled it, or to the burden or overhead of the shop department responsible.

Interest Shown in Nitriding Process

CASE hardening by the nitriding process was outlined at the last session by Dr. V. O. Homerberg, associate professor of physical metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., in an address on "Nitalloy Steels."

Equipment employed, specimens and photomicrographs of nitrided pieces were shown by lantern slides. Freedom from troublesome warpage and the greater hardness of case as compared with older methods were emphasized, and the excellent wearing properties of nitrided material, even when tested without lubrication, were discussed.

Parts to be nitrided are placed in a furnace, subjected to the action of ammonia gas for a time ranging from 2 to 90 hr. and then removed. The ammonia on passing over the steel breaks down to some extent into nitrogen and hydrogen, the nitrogen in the nascent condition readily entering the steel. With the completion of the nitriding, the parts require no further heat treatment.

The temperature of the process ranges from 900 to 1200 or 1300 deg. Fahr., 975 deg. being most commonly used. This comparatively low temperature permits the parts to be heat treated before nitriding without danger of subsequent change in physical properties. It also eliminates warpage during the case hardening, provided all strains have been previously removed. The nitriding leaves a clean surface, free from scale. Surface hardness equivalent to 1000 to 1200 Brinell is obtained.

Steels Developed for Nitriding

In developing the nitriding process, Dr. Adolph Fry, Krupp Laboratories, experimented with carbon and various alloy steels. The outcome has been the manufacture of a series of alloy steels having maximum surface hardness when exposed to ammonia gas under definite conditions. This hardness is retained at elevated temperatures and specimens showed marked resistance to atmospheric, water and salt water corrosion. The presence of molybdenum toughens both the core and the case, and the steels have high impact value. A disadvantage of the nitriding steels is the higher machining cost, but this problem is being solved by the development of high-sulphur steels.

Nitriding has been applied also to cast iron, a special white cast iron, or malleable iron being used. Annealing relieves all casting strains and makes the iron machinable. When nitrided the iron shows very high hardness; automobile engine valve tappets made

of this iron have outlasted many times tappets made of other materials.

New Nitriding Furnaces Being Brought Out

In discussing furnaces for nitriding, Dr. Homerberg said that several special units have been developed. One in particular, as yet unannounced, claims to materially reduce the cost of nitriding; another, a continuous furnace, to be announced soon, is claimed to reduce the time of the process by one-third. The containers in which the parts are nitrided present a problem. Plain carbon steel, monel metal and nickel steels have been used. Steel containers coated with enamel on the inside were said to be very satisfactory.

The necessity for complete removal of strains set up in forging, machining and in hardening, in order to prevent distortion during nitriding, was emphasized, as was also the complete removal of the decarburized layer before nitriding. If the latter precaution is not observed, as was shown by photomicrographs, the nitrided case will chip and flake.

Typical procedure followed in nitriding parts machined from annealed bars is to rough machine, heat treat to obtain desirable physical properties of the core and assure proper grain refinement, finish-machine and then nitride. Nitriding completes the process, except for a possible finishing operation, such as lapping.

The depth of case was shown to be much greater in nitriding at 1200 deg. Fahr. than at 975 deg., but marked decrease in hardness accompanies this increase in case depth. A double cycle of operations, first at the higher and then at the lower temperature, is sometimes used to obtain both greater case depth and greater hardness. Nitriding at one temperature, 975 deg., was favored, however, by Dr. Homerberg as giving the best results.

The slight growth that takes place during nitriding can be allowed for in the final machining or grinding, or can be removed afterward by lapping. Because of this growth sharp corners should be avoided; well-rounded corners and generous fillets should be given careful consideration in connection with parts to be nitrided. The growth was said to be dependent upon the amount of nitrogen introduced and, therefore, upon the case depth. It is independent of the size of the part.

Protection of threads and other areas of the piece from hardening was discussed. Nickel plating and a tin and solder mixture have been used;

a paint of tin oxide mixed with glycerin has given good results.

Wear resistance of nitrided surfaces, investigated by apparatus that simulated service conditions, was an interesting part of Dr. Homerberg's address. Results of tests by Guillet were cited. One of these was on cast iron automobile cylinders, the wear of which after 18,600 miles was 0.016 in.; on nitrided cylinders in the same service the wear was 0.0008 in.

In another series of tests by different investigators, nitrided Nitalloy was tested against itself, against gray cast iron and against a special bronze containing 80.2 per cent copper, 11.5 per cent tin, 5.5 per cent nickel, 2.8 per cent zinc, and a trace of lead. No lubrication was used. In all cases the surfaces were entirely free from scoring, and no decrease in the depth of the nitride case could be noted. At the finish the surface hardness of the nitrided pieces was the same as at the start of the test. The friction coefficient of Nitalloy on the special bronze was 0.095; this combination was pointed out as useful where both corrosion and wear must be resisted.

Nitrided Gears Carry Higher Stresses

In a recent comparative test of nitrided and case-hardened gears at the Massachusetts Institute of Technology, cited by Prof. Earle Buckingham, a pair of 4-in. gears were loaded until disintegration of the surface was detected.

Results of the tests indicated that a 200,000 lb. compressive stress would represent the ultimate limit of the case-hardened gears, while one set of nitrided gears showed 235,000 to 280,000 lb. compressive strength. The surface of the nitrided gears was said to show that they could carry stresses about 25 per cent higher than the case-hardened gears, and that the nitrided gears would carry much greater loads. Some of the nitrided gears dropped very close to the case-hardened gears when treated at high and low temperatures.

Making the Plant Safe

Methods used by employers to provide safe working conditions in their plants are described in a report entitled *Making the Plant Safe*. This publication, issued by the Policyholders Service Bureau of the Metropolitan Life Insurance Co., is the ninth in a series of reports based upon a study of the field of safety engineering, and designed to present the principles governing successful accident prevention work. Copies may be had on request to the company.

This report discusses the need for adequately guarding certain types of machinery and certain operations, and relates some of the fundamentals for instituting these safeguards and getting them used. Other sections deal with the maintenance of guards, the machinery which should be protected, plant housekeeping, and the proper care of hand tools as a matter of accident prevention.

Coal Pulverizer for Small Industrial Plants

A NEW type of industrial pulverizer has been designed by Aubrey J. Grindle, president, Pulverized Fuel Equipment Co., division of the Rockford Drilling Machine Co., which is a subsidiary of the Borg-Warner Corporation. This is known as the type "B" Purfeco unit. The company designs and furnishes pulverizers for small furnaces and domestic and industrial heating purposes in capacities as low as 6 lb. and as high as 5000 lb. of coal an hour.

In the pulverizer a disk-and-plow-type feeder extracts tramp iron by means of a drum-type magnetic separator. There is a revolving table which receives the coal. The plow scrapes the desired volume off the table and it is then fed into the top of the pulverizer.

The mill is of the vertical-shaft type, with one stage of swing hammers above the fine grinding. The coal is held in liners arranged in the form of circular pockets. Coarser particles of coal are held in these pockets by centrifugal force of the beaters, thus creating and combining impact and attrition action on the coal. A slight air current separates the fine dust and carries it to the discharge, whence it is blown through the burners to the furnace.

This is a complete firing unit, requiring but one motor for feeding and furnishing combustion air. It also is equipped with an exhaustor of sufficient capacity to furnish all air for combustion.

A graduated dial on the coal plow

controls the coal feed. There are no belts or ratchets, and no storage of pulverized coal, which eliminates dust-

collecting problems. The air inlet at the top of the mill may be closed to increase fineness of pulverization. Repairs are made through doors in housing, without dismantling the unit.

Lift Truck Capable of High Tiering

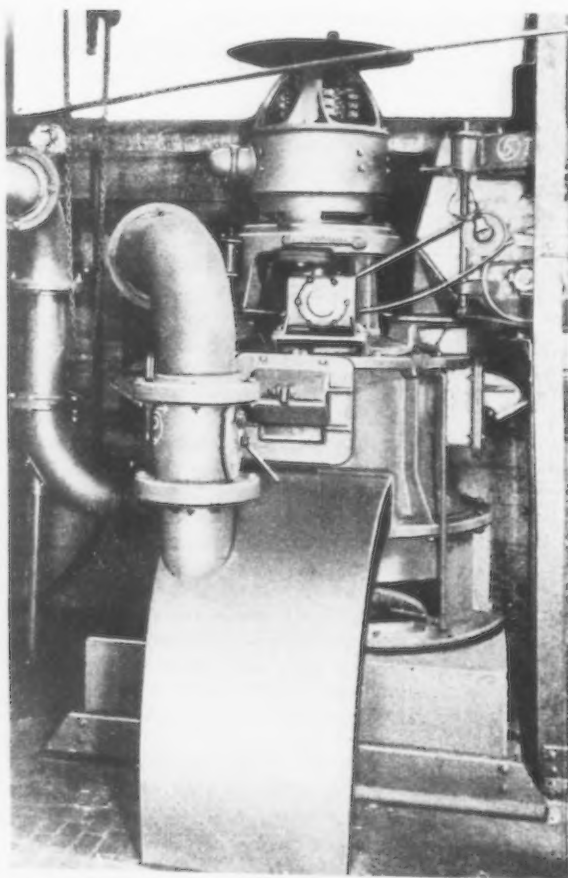
A TELESCOPIC tier-lift truck, capable of lifting up to and including a height of 15 ft., has been developed by the Wright-Hibbard Industrial Electric Truck Co., Inc., Phelps, N. Y.

The truck is capable of operating

throughout the plant, and yet is able to lift to a height sufficient to eliminate the necessity of stackers or hand-piling. It is so designed that it can be run through ordinary doorways of normal height.

By means of remote control, ar-

By use of telescoping members an unusual height of lift is obtained, when needed



Industrial Coal Pulverizer Operated by One Motor for Both Grinding and Air Supply

ranged on the side of the channels, the operator of the truck can ride on the platform and load or unload material. This remote control allows him to stop the platform at any height desired. A ladder on the side of the uprights is supplied as standard equipment, so that workmen can climb to the platform if additional help is needed to assist the operator in loading or unloading.

This truck can be supplied with various platform sizes and various heights in lowered position. The compactness of design and short turning radius allow these trucks to operate under congested conditions.

The truck is particularly applicable to piling in warehouses, where all space up to the ceiling may be used; to loading to and unloading from mezzanine floors; and in general plant maintenance, such as hanging

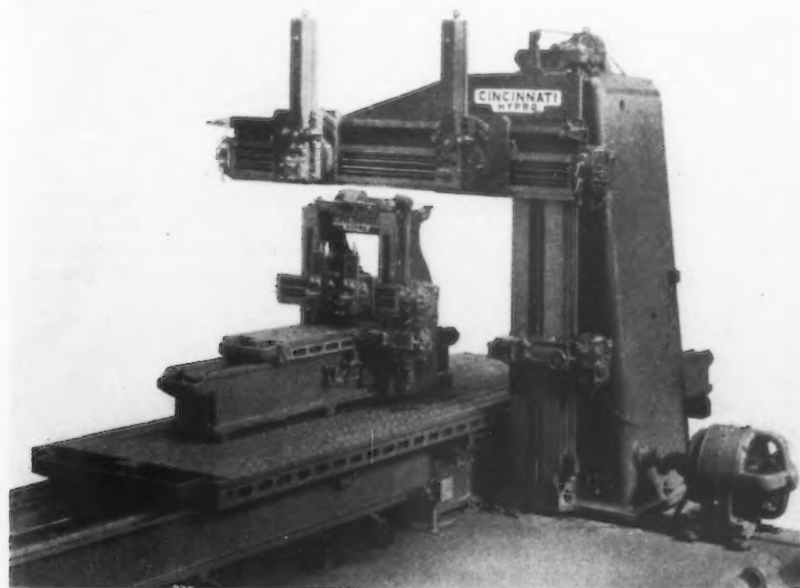
shafting, etc. Another feature is that box cars can be loaded and unloaded right up to the roof. Savings can be

made in such work as storing in racks, piling in racks to the ceiling, etc.

Builds Large Open-Side Planer

AN open-side planer of unusual size, one of the largest ever built in the United States, has been completed by the Cincinnati Planer

moving units by means of a pump and system of piping. All castings used in this machine are unusually heavy, assuring rigidity when planing at the



Co., Cincinnati. The capacity underneath the rail is 96 in. and the left-hand head can machine the side of a casting 125 in. wide.

Control of all operations is by push buttons, those for the heads being at the end of the rail and on the side head. These, with a conveniently placed pendant switch, give the operator complete control of table and head movements, as well as of raising and lowering of the rail.

The rail is clamped to the uprights by means of an electric torque motor which is also operated by a push button. Power for raising and lowering the rail is supplied by a second motor, and these two small motors are interlocked so that the rail cannot be raised or lowered when it is clamped or partly clamped. A red light located at both ends of the rail and visible from any point in front of the machine shows the operator that the rail is clamped.

Heads may be rapid traversed independently of each other and can be run together without damage. The slides have a down feed of 40 in. below the bottom of the rail. Special toolholders permit planing in pockets located any distance below the bottom of the rail within the capacity of the machine.

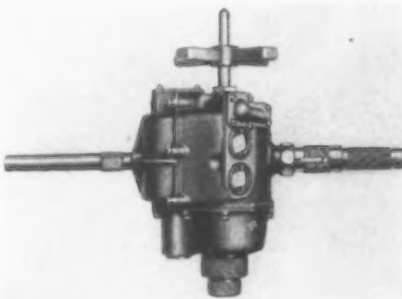
Continuous lubrication is supplied to the ways, gearing, heads and other

extreme end of the rail. The main upright weighs approximately 60,000 lb., while the weight of the entire machine is about 235,000 lb.

Pneumatic Drills for Heavy Duty

STURDILY built and powerful, the new No. 44 pneumatic drill recently added to the Little Giant line of the Chicago Pneumatic Tool Co., 6 East Forty-fourth Street, New York, is intended for heavy drilling operations. Both reversible and non-reversible types are made.

Features include a long-stroke block-type motor with valves and piston in one casting, a construction



emphasized as permitting short ports and less opportunity for air leakage. A sensitive throttle of new design is intended to assure accurate speed control, which is an advantage in staybolt tapping. The split crankcase facilitates removal of all pistons and the crank. Pistons are held to offset toggles by ball-and-socket joint; this, in permitting the piston to turn in the cylinder, results in even wear. Valves are interchangeable, right and left, and the crankshaft is counter-balanced. Throttle parts are made of stainless steel.

An automatic safety stop pin in the reversing throttle handle brings the drill to "stop" or neutral position unless the operator desires to shift from forward to reverse, or vice versa. A hole may be drilled in the cylinder casting for horizontal suspension.

The drilling and reaming capacity of the No. 44 RCA reversible air drill illustrated is 2 in.; the tapping capacity is 1 1/4 in. and the flue rolling capacity is 3 in. The net weight in malleable iron is 56 lb. and in aluminum alloy 43 lb. The light speed is 265 r.p.m., and the length of feed is 3 1/2 in. The length, overall, is 17 in.

A. S. M. E. Officers for 1931 Are Elected

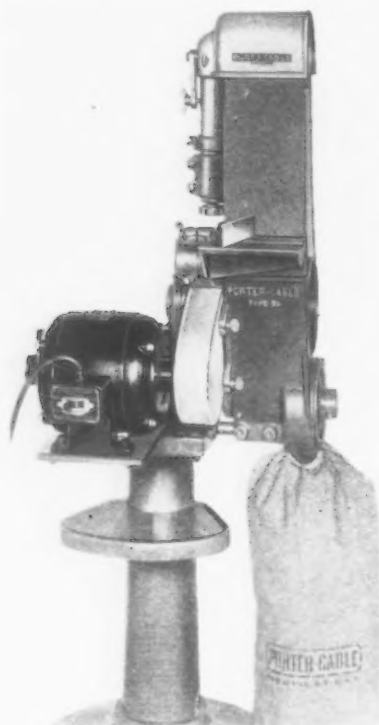
THE election of officers of the American Society of Mechanical Engineers for 1931 was announced by the tellers of election on Sept. 23 after canvassing the ballot of the membership. The new officers of the society are as follows: President, Roy V. Wright, managing editor, *Railway Age*, New York; vice-presidents, William A. Hanley, chief engineer, Eli Lilly Co., Indianapolis; Thomas R. Weymouth, president, Oklahoma Natural Gas Corp., Tulsa, Okla.; Harvey N. Davis, president, Stevens Institute of Technology, Hoboken, N. J.; managers, W. L. Batt, president, SKF Industries, Inc., New York; H. L. Doolittle, chief designing engineer, Southern California Edison Co., Los Angeles, Cal.; H. L. Whitemore, chief, Engineering, Mechanics Section, Bureau of Standards, Washington.

Representatives on the American Engineering Council are as follows: W. R. Webster, Bridgeport, Conn.; R. V. Wright, New York; J. W. Roe, New York; Robert Yarnall, Philadelphia; E. N. Trump, Syracuse, N. Y.; B. E. Hull, Houston, Tex.; E. O. Eastwood, Seattle, Wash.; W. Trinks, Pittsburgh; Warner Seely, Cleveland, and William S. Conant, Washington.

A. O. Smith Corp., Milwaukee, reports pipe shipments in September of 2911 carloads, equivalent to 617 1/2 miles, or a total of 89,800 tons. This represents a 31 per cent increase in carloads and a 43 per cent increase in mileage over the previous high month, which was July of this year.

Vertical and Horizontal Belt Sander

FOR rapidly putting a straight grain finish on metal, wood, fiber, bakelite and other materials, a combination vertical and horizontal belt sander designated as the type B-9 is offered by the Porter-Cable Machine Co., Syracuse, N. Y. Even and true finish of the work is attributed



in part to the flat metal bed that serves as a firm backing for the sanding belt. Other metal working uses include removing burrs, cleaning up castings, tool sharpening and polishing.

The machine has a two-speed arrangement permitting selection of suitable surfacing speed for either wood or metal. The speed is changed quickly by lifting the motor and placing the belt into the proper grooves in motor and drum pulleys, the weight of

the motor acting as an automatic take-up on the V-belt. A vacuum dust collecting system is built into the machine. This includes a vacuum fan located in the lower dust chute and driven by V-belt from the drum pulley. The dust is carried into a bag or conveyed elsewhere by attaching a flexible pipe. High vacuum is emphasized as preventing excessive clogging of the belt, keeping the grit sharper, and assuring more rapid finishing of the work.

Abrasive belts are changed without removing the guard or idler pulley. Belt tension is controlled by a spring device, which, acting on the idler pulley, takes up belt stretch automatically. This spring tension is released by tightening a knob at end of the post. Tracking of the belt is controlled by one thumb screw which tightens the idler pulley. An automatic belt guard eliminates breaking the edge of the belt and prevents the belt from cutting the frame of the machine.

Change from vertical to horizontal operating position is made simply by loosening two wing screws. For the horizontal position a special edging guide is provided, which guide permits handling long work and assures square edges. The sanding or grinding bed can be adjusted in and out to give correct surface tension to the belt and to permit use of a felt cover for flexibility. The bed may be removed entirely for slack belt sanding, and if the bed becomes worn at the table end it can be reversed. Compound angles can be secured by a graduated tilting table.

Dust proof precision ball bearings lubricated through Alemite-Zerk fittings are used throughout. The motor speed is 1725 r.p.m., while the belt speed is 3000 and 4000 ft. per min. The abrasive belt is 6 in. wide and 54½ in. long. The bench type machine weighs 260 lb. and the pedestal type 350 lb., net.

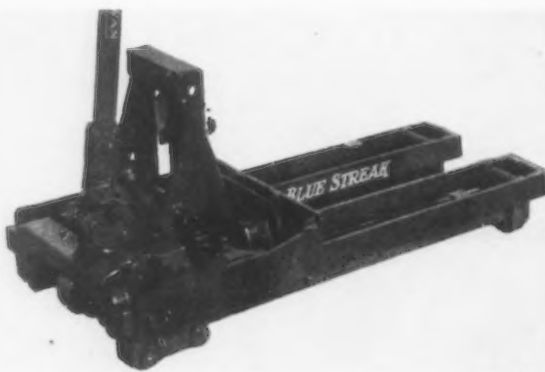
Lift Truck for Handling Tin Plate on Skids

A LIFT truck for handling tin plate loaded on skids or stringers has been developed by the Stuebing division of the Yale & Towne Mfg. Co., Cincinnati. It has been found to be most useful in handling loads up to 2500 lb. and is called the Blue Streak.

The tin plate is loaded on three stringers, 3¼ x 3¼ x 24 in., and is held in place by metal strapping. Such a loaded unit can be shipped by truck, freight or boat without damage to the product or to

the unit in which it is transported.

This truck is so constructed that the two parallel frames in the rear can be easily pushed between the



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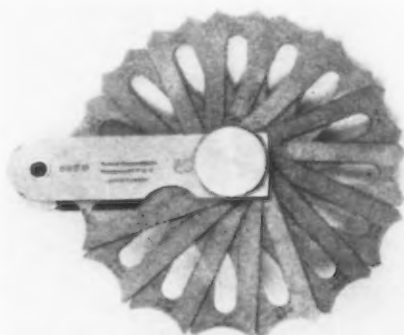
stringers and then, by a single forward motion of the steering handle, the load is elevated 1½ in. A capacity load can be moved without overexertion to the operator, for all the wheels have ball bearings.

It is believed that many concerns which do not receive or ship enough tin plate to warrant the use of an electric tier lift truck will be able to use to good advantage such a truck as this.

Offers Gages for Checking Fillets and Radii

A SERIES of gages intended to simplify the checking of fillets and radii has been placed on the market by the Brown & Sharpe Mfg. Co., Providence.

Concave and convex radii of the same size are included on the one blade, thus reducing by half the number of blades necessary for a given range. The blades are long and may be used in difficult places; they slide easily, and the slotting making several blades available at the one time. The metal from which these gages are

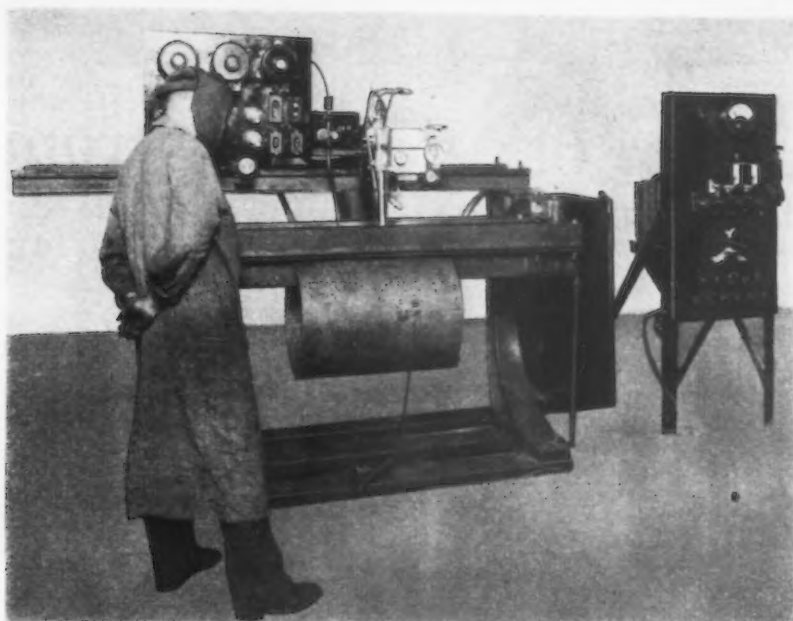


The gage above is useful in laying out forming tools, while that shown below is adapted for checking fillets and radii in corners or against shoulders



made was selected to combine light weight with strength.

Two styles of these gages are made. One designated as the 627A and 627B is for checking fillets and radii in corners or against shoulders. The range of the former is from 1/32 to 17/64 in., and that of the latter 1/32 to 17/64 in., by sixty-fourths. The second style, designated as the No. 627C and 627D, is useful in laying out forming tools and similar work. The range of the No. 627C is from 1/32 to ¼ in. and of the No. 627D, 17/64 to ½ in., by sixty-fourths.



Develops Atomic Hydrogen Automatic Seam Welder

AN automatic welder using the atomic hydrogen welding process was exhibited by the General Electric Co. at the National Metals Exposition held in Chicago, Sept. 22 to 27. Previous atomic hydrogen welders were for hand welding only.

Designed for longitudinal seam welding, the new welder consists of a work-clamping device, an automatic traveling carriage, a welding head and the usual control devices, and other accessories. The clamping mechanism and travel carriage are of standard types, while the welding head, control, etc., are special to suit the use of atomic hydrogen welding. In addition there is an auxiliary device for feeding filler rod into the arc, as the tungsten electrodes used to form the arc are consumed slowly and do not contribute metal to the weld.

In operating the machine, the work is clamped in place, the travel carriage set at one end of the seam and the "start" push button is depressed. From this point operation is automatic. With the pressing of the "start" button the line contactor closes, applying power to the equipment and simultaneously opening a valve supplying hydrogen to the arc. The striking of the arc, movement of the travel carriage and length of the arc are controlled automatically.

By means of the atomic hydrogen welding process, previously described in these pages, hitherto unweldable metals can be melted and fused without trace of oxidation, and welding can be performed in some cases on metals as thin as a sheet of ordinary writing paper. The method utilizes the passage of a stream of hydrogen through the arc between two electrodes. The heat of the arc breaks up the hydrogen molecules into atoms and these combine again a short distance beyond the arc into molecules

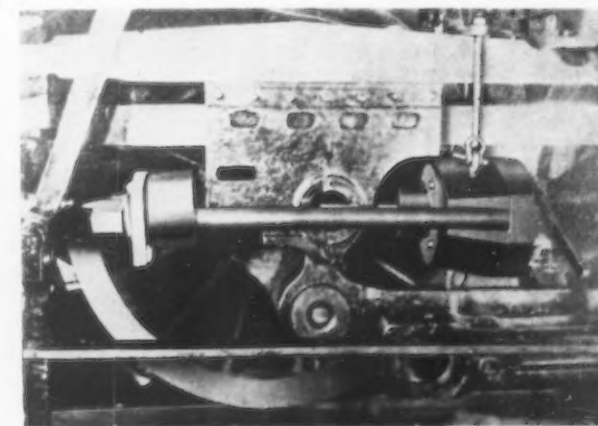
of the gas. In so doing they liberate a large amount of heat and thus provide unusually effective welding temperatures. Atomic hydrogen is a powerful reducing agent, and reduces any oxides which might form on the surface of the metal. Alloys containing chromium, aluminum, silicon or manganese can be welded without fluxes and without surface oxidation.

Hydraulic Device Removes Locomotive Pistons

TO facilitate the separation of piston rods from crossheads, the Watson-Stillman Co., 75 West Street, New York, is furnishing the Watson-Stillman - Hollowell piston kicker, here shown attached to the frame of a locomotive, ready to remove the piston.

The device develops hydraulic pressure of 125 tons through the hand pump shown. It uses the entire crosshead, and not the pin fit, for purchase, a feature emphasized as eliminating

Piston rods are separated from crossheads, the device using the entire crosshead, not the pin fit, for purchase



marring of the fit and avoiding the possibility of cracking the crosshead. A special elevating and tilting buggy, not shown in illustration, can be furnished for transporting the piston kicker and parts from job to job. This buggy also simplifies setting up the equipment for its work. The time required to set up, remove and tear down the equipment is said to average about 20 min.

New Welding Electrodes

COINCIDENT with the progress of modern welding practice as carried on in the shops and laboratories of the Westinghouse Electric & Mfg. Co., East Pittsburgh, the company has developed a general-purpose steel welding electrode. This is now used in Westinghouse shops for welding 2000 tons of steel monthly.

To insure uniformity, each coil of wire is arc tested prior to straightening and cutting. All processes, from steel to bundled wire, are under proper supervision to assure sustained quality and uniformity. The reduced metal spattering effected by the use of these electrodes assures a quiet, stable and flexible arc at both extreme low and high current values. And the easy arc manipulation gives the operator a flexible tool for vertical and overhead welding. These electrodes have a uniform melting rate which assures quick penetration, and a perfectly fused bead that blends with the general appearance of the completed product.

The general welding of steel, for which Flex-Arc electrodes are recommended, represents approximately 90 per cent of all welding applications. It includes the following classes of work: structural steel machinery parts, structural fabrication, boilers and tanks, firebox seams, pipe lines, low-carbon steel forgings and castings, locomotive frames, general building up work and cast iron where steel studs are used.

The structural and rail mill now under construction at the Weirton, W. Va., plant of Weirton Steel Co. will go into operation about Dec. 1.

Iron Output Down 6.8 Per Cent from August—Net Loss of 16 Stacks

SEPTEMBER pig iron output suffered a decidedly sharp loss from August. Actual returns from every blast furnace blowing during the month show that the daily rate last month at 75,890 gross tons was 6.8 per cent under that for August, accompanied by a large net loss in active furnaces.

Production of coke pig iron in September was 2,276,770 gross tons, or 75,890 tons per day for the 30 days. This compares with 2,523,921 tons, or 81,417 tons per day, in August. The loss in daily rate for September was

therefore 5527 tons, or 6.8 per cent. Corresponding losses in August and July were 4.3 per cent and 13 per cent respectively.

The September daily rate of 75,890 tons is the smallest since September, 1924, when it was 68,442 tons.

Comparisons for 9 Months

Output for the first nine months of this year was 25,701,540 tons, which contrasts with 32,679,324 tons for the same nine months in 1929, and with 27,791,629 tons to Oct. 1, 1928. The next most recent smallest total for

nine months was in 1924, when the output to Oct. 1 was 23,159,900 tons.

Net Loss of 16 Furnaces

There were 18 furnaces blown out or banked during September, with only 2 blown in, a net loss of 16 stacks for the month. This compares with a net loss of 5 in August, of 16 in July and of 20 in June—57 in the last four months or 62 since April 1.

Operating Rate on Oct. 1

For the 123 furnaces blowing on Oct. 1, the operating rate is estimated

Daily Average Production of Coke Pig Iron in the United States by Months Since Jan. 1, 1926—Gross Tons

	1926	1927	1928	1929	1930
Jan.	106,974	100,123	92,573	111,044	91,209
Feb.	104,408	105,024	100,004	114,507	101,390
Mar.	111,032	112,366	103,215	119,822	104,715
Apr.	115,004	114,074	106,183	122,087	106,062
May	112,304	109,385	105,931	125,745	104,283
June	107,844	102,988	102,733	123,908	97,804
½ year....	109,660	107,351	101,763	119,564	100,891
July	103,978	95,199	99,091	122,100	85,146
Aug.	103,241	95,073	101,180	121,151	81,417
Sept.	104,543	92,498	102,077	116,585	75,890
Oct.	107,553	89,810	108,832	115,745	.....
Nov.	107,890	88,279	110,084	106,047	.....
Dec.	99,712	86,960	108,705	91,513	.....
Year	107,042	99,266	103,382	115,851	.....

Pig Iron Production by Districts, Gross Tons

	Sept. (30 days)	Aug. (31 days)	July (31 days)	June (30 days)
New York and Mass....	132,873	157,034	162,328	215,442
Lehigh Valley	66,448	70,491	67,348	69,996
Schuylkill Valley	25,664	29,501	44,312	37,911
Lower Susq. and Leba- non Valley	19,427	18,579	19,426	22,503
Pittsburgh district....	554,662	581,528	605,414	647,557
Shenango Valley	64,584	68,735	70,917	67,861
Western Pennsylvania...	60,241	65,850	61,886	75,140
Maryland, Va. and Ky..	91,066	98,214	93,697	97,980
Wheeling district....	132,627	145,330	142,492	149,070
Mahoning Valley	186,436	224,891	246,176	255,071
Central and North'n Ohio	200,266	227,826	258,435	276,722
Southern Ohio	42,658	43,851	47,076	48,279
Illinois and Indiana	427,819	486,334	507,822	620,941
Mich., Minn., Mo., Wis., Colo. and Utah	110,202	114,057	119,769	125,598
Alabama	161,797	191,700	192,002	222,330
Tennessee .....	.....	.....	437	1,728
Total	2,276,770	2,523,921	2,639,537	2,934,129

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works Iron	Merchant Iron*	Total
September, 1929....	95,426	21,159	116,585
October	93,644	22,101	115,745
November	83,276	22,771	106,047
December	68,152	23,361	91,513
January, 1930....	71,447	19,762	91,209
February	81,580	19,810	101,390
March	83,900	20,815	104,715
April	85,489	20,573	106,062
May	84,310	19,973	104,283
June	77,883	19,921	97,804
July	66,949	18,197	85,146
August	64,857	16,560	81,417
September	62,342	13,548	75,890

*Includes pig iron made for the market by steel companies.

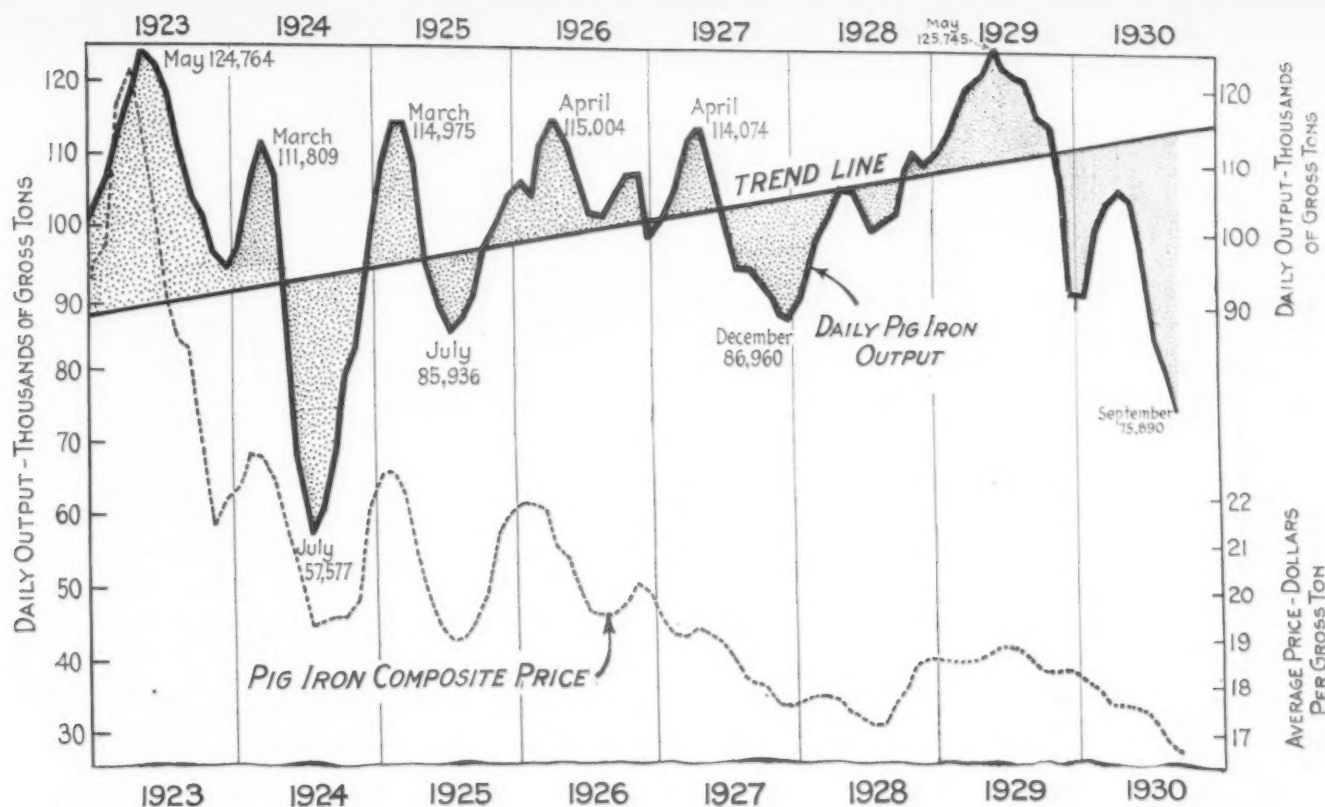
Coke Furnaces in Blast

	Oct. 1		Sept. 1	
	Number in Blast	Rate of Operation	Number in Blast	Rate of Operation
New York:				
Buffalo	6	3,495	8	4,450
Other N. Y. and Mass.	2	800	2	615
New Jersey	0	.....	0	.....
Pennsylvania:				
Lehigh Valley	5	2,215	5	2,265
Schuylkill Valley	1	335	2	950
Susquehanna Valley ..	1	645	1	600
Ferromanganese	0	.....	0	.....
Lebanon Valley	0	.....	0	.....
Ferromanganese	0	.....	0	.....
Pittsburgh District....	27	18,085	27	18,215
Ferromanganese	2	290	3	465
Shenango Valley	3	1,820	4	2,215
Western Pennsylvania	4	1,825	4	2,410
Ferromanganese	1	180	1	95
Maryland	4	2,720	4	2,540
Wheeling District....	6	4,185	7	4,690
Ohio:				
Mahoning Valley	7	5,060	11	7,255
Central and Northern	11	6,670	11	6,670
Southern	4	1,420	4	1,415
Illinois and Indiana	19	14,960	21	15,400
Mich., Wis. and Minn....	5	2,700	6	2,845
Colo., Mo. and Utah	2	825	2	815
Ferromanganese	1	120	1	85
The South:				
Virginia	1	250	1	255
Kentucky	0	.....	1	370
Alabama	11	4,925	13	6,000
Ferromanganese	0	.....	0	.....
Tennessee	0	.....	0	.....
Total	123	73,525	139	80,620

Production of Coke Pig Iron in United States by Months Beginning Jan. 1, 1928—Gross Tons

	1928	1929	1930
Jan.	2,869,761	3,444,370	2,827,464
Feb.	2,900,126	3,206,185	2,838,920
Mar.	3,199,674	3,714,473	3,246,171
Apr.	3,185,504	3,662,625	3,181,868
May	3,283,856	3,898,082	3,232,760
June	3,082,000	3,717,225	2,934,129
½ year....	18,520,921	21,640,960	18,261,312
July	3,071,824	3,785,120	2,639,537
Aug.	3,136,570	3,755,680	2,523,921
Sept.	3,062,314	3,497,564	2,276,770
9 months....	27,791,629	32,679,324	25,701,540
Oct.	3,373,806	3,588,118	.....
Nov.	3,302,523	3,181,411	.....
Dec.	3,369,846	2,836,916	.....
Year*	37,837,804	42,285,769	.....

*These totals do not include charcoal pig iron. The 1929 production of this iron was 138,193 gross tons.



Daily production of pig iron is now proportionally about as much below needs as in 1924

Inclined line represents the gradually increasing theoretical needs of the country, ascertained by a balancing of the ups and downs in production. It shows an average yearly increase in consumption of about 1,275,000 tons

at 73,525 tons per day, which contrasts with 80,620 tons daily for the 139 furnaces active on Sept. 1.

Of the 18 furnaces shut down during September, 10 were independent steel company stacks, 7 belonged to the Steel Corporation, and one was a merchant furnace. The two stacks blown in are credited to the Steel Corporation. The net loss in steel-making furnaces was 15.

There was a sharp loss in steel-making iron last month. At only 62,342 tons per day, it registered a decline of 3.8 per cent from August. Likewise merchant iron, at only 13,

548 tons daily, was less than in August by 1.8 per cent. Both of these are the lowest levels in many months.

Furnace Changes During September

Only two furnaces were blown in during September; one furnace at the Gary plant of the Illinois Steel Co. and No. 5 Fairfield furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama.

The following furnaces were blown out or banked during September: J furnace at the Lackawanna plant of the Bethlehem Steel Corporation and

the Niagara furnace in the Buffalo district; the Swede furnace of the Alan Wood Steel Co. in the Schuylkill Valley; No. 2 Lucy furnace of the Carnegie Steel Co. in the Pittsburgh district; one Ashland furnace of the American Rolling Mill Co. in Kentucky; No. 5 Ohio furnace of the Carnegie Steel Co., the Mary furnace of the Sharon Steel Hoop Co., No. 2 Hubbard furnace of the Youngstown Sheet & Tube Co. and the Trumbull-Cliffs furnace of the Republic Steel Corp. in the Mahoning Valley; one Shenango furnace of the Shenango Furnace Co. in the Shenango Valley; the Martins Ferry furnace of the Wheeling Steel Corp. in the Wheeling district; one South Chicago furnace and No. 9 Gary furnace of the Illinois Steel Co. and one Madeline furnace of the Inland Steel Co. in the Chicago district; the Zenith furnace in Minnesota; and three Ensley furnaces of the Tennessee Coal, Iron & Railroad Co. in Alabama.

Production of Steel Companies for Own Use—Gross Tons

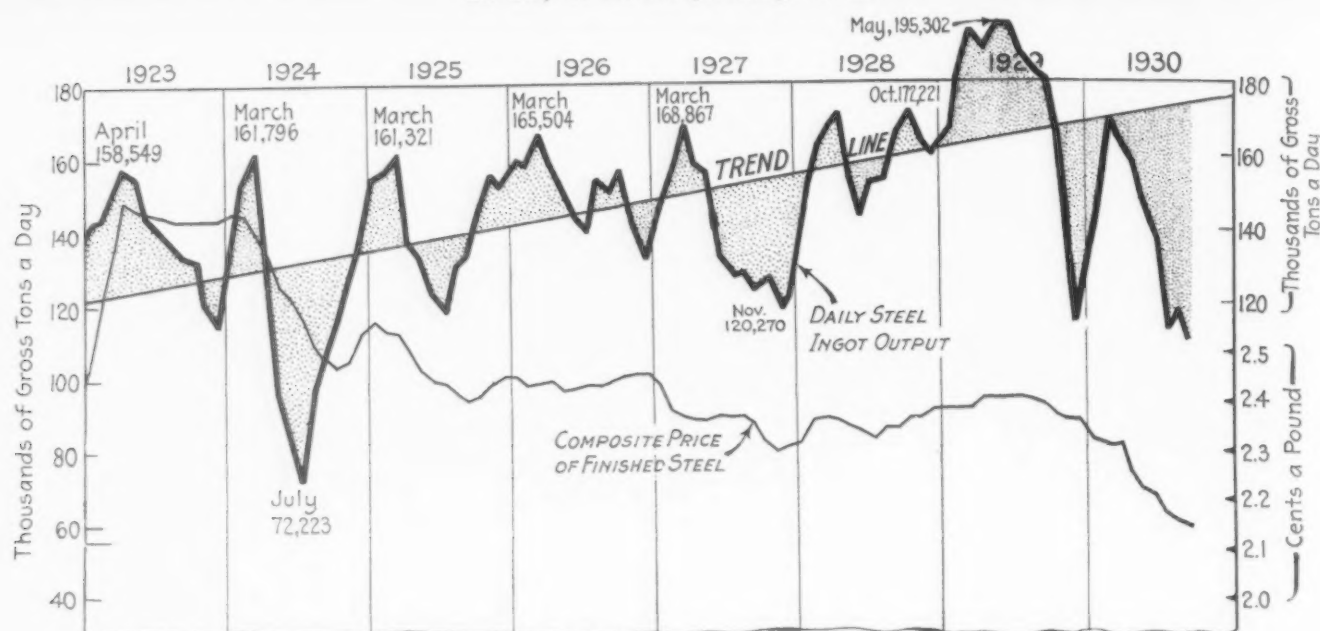
	Total Pig Iron Spiegel and Ferromanganese			Ferromanganese*		
	1928	1929	1930	1928	1929	1930
Jan.	2,155,133	2,651,416	2,214,875	22,298	28,208	27,260
Feb.	2,274,880	2,498,901	2,284,234	19,320	25,978	21,310
Mar.	2,588,158	2,959,295	2,600,980	27,912	24,978	23,345
Apr.	2,555,500	2,826,028	2,564,681	18,405	22,413	27,777
May	2,652,872	3,105,404	2,613,628	29,940	25,896	30,296
June	2,448,905	2,999,798	2,304,223	32,088	33,363	27,327
½ year	14,675,448	17,040,842	14,582,621	149,963	160,836	157,325
July	2,464,896	3,039,370	2,075,414	32,909	31,040	17,728
Aug.	2,561,904	3,065,874	2,010,572	24,583	28,461	20,909
Sept.	2,477,695	2,862,799	1,870,269	22,278	27,505	21,181
9 months	22,179,943	26,008,885	20,538,876	229,733	247,842	217,143
Oct.	2,729,589	2,902,960	.....	23,929	31,108	.....
Nov.	2,654,211	2,498,291	.....	29,773	31,866	.....
Dec.	2,647,863	2,112,704	.....	28,618	28,564	.....
Year	30,211,606	33,522,840	.....	312,063	339,380	.....

*Includes output of merchant furnaces.

Republic Pipe Shipments Make Monthly Record

Shipments of pipe of the Republic Steel Corporation in September made a new high monthly record, exceeding August shipments by 25 per cent, with all three units of the electric welding pipe mill booked to capacity through October. Republic is now producing an average of 22 miles of electric welded pipe daily.

Ingot output in September turned downward again, more than canceling the August gain. Prices in September continued the drop of the five preceding months



Ingot Production Drops Again, Going to a New Low for Year

PRODUCTION of open-hearth and Bessemer steel ingots in the United States in September is calculated by the American Iron and Steel Institute at 2,867,978 gross tons, a decline of 7.3 per cent from August. This reverses the forward movement

in August, the first since last February, which was at a level of about 1,000,000 tons higher.

September production represented the lowest daily average tonnage since September, 1924, when the rate was 108,755 tons daily. It was, however,

only 8.3 per cent below the figure for November, 1927.

On the daily basis, with 26 working days, September shows 110,307 tons. This is about 39 per cent lower than the average for September, 1929, which was the highest September ever reached.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(Gross Tons)

	Reported by Companies Which Made 94.27 Per Cent of the 1929 Ingots		Calculated Output of All Companies		No. of Working Days
	Open-Hearth	Bessemer	Monthly	Daily	
Total, 1928-1929	40,538,657	6,591,217	49,865,185	160,338	311
1929					
January	3,692,062	549,616	4,500,131	166,672	27
February	3,590,826	489,279	4,328,713	180,363	24
March	4,180,408	596,691	5,068,176	194,930	26
April	4,025,409	640,351	4,950,653	190,387	26
May	4,275,161	707,484	5,286,246	195,787	27
June	3,999,363	622,004	4,902,955	196,118	25
6 months	23,763,229	3,605,425	29,036,274	187,331	155
July	3,922,053	649,950	4,850,583	186,561	26
August	3,987,400	668,023	4,939,086	182,929	27
September	3,624,954	642,886	4,527,887	181,115	25
9 months	35,297,636	5,566,284	43,353,830	186,064	233
October	3,631,674	642,235	4,534,326	167,939	27
November	2,796,214	522,672	3,521,111	135,427	26
December	2,375,797	360,489	2,903,012	116,120	25
Total, 1929-1930	44,101,321	7,091,680	54,312,279	174,639	311
1930					
January	3,137,002	441,572	3,796,090	140,596	27
February	3,336,021	508,618	4,078,327	169,930	24
March	3,513,904	539,616	4,299,905	165,381	26
April	3,406,610	509,234	4,153,860	159,764	26
May	3,265,190	528,968	4,024,778	149,066	27
June	2,835,527	407,586	3,440,239	137,610	25
6 months	19,494,254	2,935,594	23,793,199	153,505	155
July	2,411,592	353,723	2,933,399	112,823	26
August	2,543,466	374,467	3,095,293	119,050	26
September	2,273,668	429,975	2,867,978	110,307	26
9 months	26,722,980	4,093,759	32,689,869	140,300	233

Sixth Largest 9-Month Total

FOR the first nine months of 1930 production was 32,689,869 gross tons. The average daily rate for the period was 140,300 tons, which is 24.6 per cent lower than the similar average for the first nine months of 1929—the highest figure ever reached.

Except for 1929, the first nine months of this year compare favorably with a number of the high years in the past. The total is down 11.5 per cent from 1928 (the record, prior to 1929), about 3.2 per cent from 1927, approximately 8.4 per cent from 1926 (the record, prior to 1928), and 3.6 per cent from 1923. Aside from the five years named the total was higher than for the first nine months of any year we have had. It was at a daily rate equivalent to 43,600,000 tons for the year.

Electric and crucible ingots, as for several years, are not included in our figures. They have not been included since 1926. They have recently accounted for about 1 per cent of the total ingot tonnage. Production of electric and crucible ingots in 1929 averaged about 1725 tons to the working day.

Production Recessions and Recoveries

SEVEN recessions and recoveries in steel production are traced in the diagram, from the beginning of each movement until the recovery is substantially complete. These include that portion of the present recession which has already elapsed. Pig iron is the basis for the earliest four curves. Steel ingot output, being now available monthly, was used for the three cases since the World War.

The recession in the present case has been the least severe of any shown. The drop from the maximum rate in June, 1929, to the low figure in July, 1930, a period of 13 months, was 42.5 per cent.

How Far Production Declined

Compared with this, the drop from December, 1891, to October, 1893, was 59.5 per cent and a second nadir in the following June was almost as low. In 1896 the low in October was 47.9 per cent below the high of November, 1895. The December, 1903, low was 51 per cent below the high of the preceding June. In January, 1908, a low was reached, 55.3 per cent below the high in October, 1907, only three months before.

In 1921 the greatest decline occurred, the low of July having been 76 per cent below the previous maximum, in September, 1918; compared with October, 1920, this 1921 low showed a decline of 73.3 per cent. In 1924 the July low was 55.4 per cent below the high in March of the same year.

In the present movement a minimum was reached in six months and then, after a partial recovery, a slightly lower figure came 13 months after the original high. In contrast with this the 1924 minimum was reached in four months; that of 1907-08 in three months; that of 1903 in six months.

In the earliest case shown it took almost two years to reach the low, and eight months later this low was almost duplicated. Eleven months elapsed in 1895-96 between a record high and the following low. In 1921 the low came nine months after a

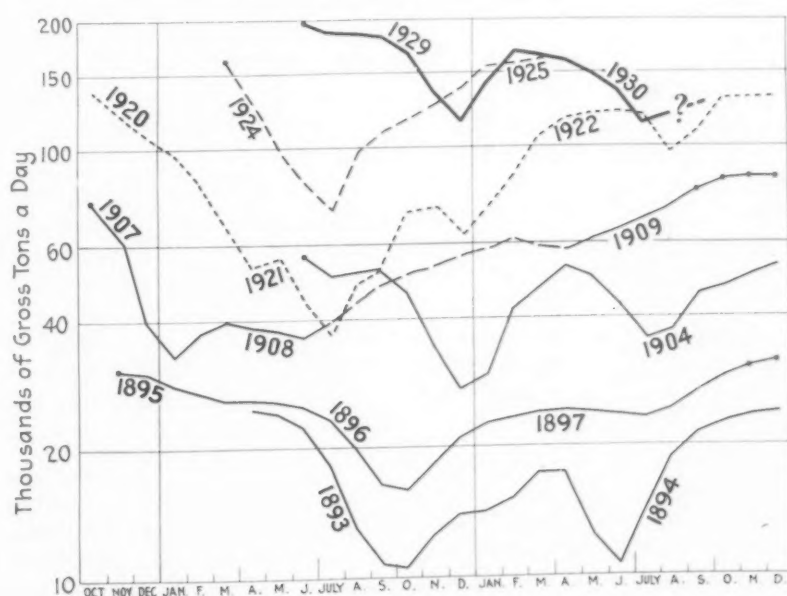
previous high, but almost three years after the previous record.

Recoveries have varied considerably. After June, 1894, the curve shot up sharply and reached a temporary crest in December. In 1896-97 a new high record was made in 11 months, after an almost continuous but gradual up-movement. A considerable bulge in the first half of 1904 was followed by a secondary slump and recovery, bringing output one year after the low, up almost to the previous high.

In 1908-09 a much slower recovery from the low of January, 1908, brought a new high record in September, 1909—20 months later. Meantime, the curve had shown an almost steady upward movement, but with a decidedly gradual slope. Recovery in 1921-22 was punctuated with occasional minor setbacks, and it took about 15 months to reach a high level but several months later a new high record was made. In 1924 recovery was substantially completed, and without any intermediate declines, in eight months.

The average length of recovery in the six completed cycles shown was about 15 months. If we count this from last December, that period would elapse next March.

Underlying conditions differ markedly in the present case from those before. There was not the commodity speculation which has occurred so many times in the past, nor has there been anything approaching a money stringency. The decline has not been so severe as in any of the six preceding cases shown, or even so severe as those of 1914 and 1919, which are not shown. Yet there is no great deficiency in any one field of steel consumption and besides the lack of any potential demand of high promise, the world breadth of the depression is a strong deterrent influence. It remains that a small expansion, such as would follow a more or less general decision to increase the existing narrow margin of stocks, would doubtless change the whole complexion of the industrial situation.



**CURVES OF STEEL
INGOT
PRODUCTION**

SEVEN depressions in four decades, all six of the earlier ones having been deeper than the present. Recoveries to a high rate of operation have averaged about 15 months. This ratio chart shows proportional movements.

W. W. MACON
Editor

THE IRON AGE

A. I. FINDLEY
Editor Emeritus

(ESTABLISHED 1855)

Mr. Replogle's Proposal for Britain

THAT British steel manufacturers have been thinking seriously on what their industry must do to be saved has been known to a number of American engineers for some time. This cablegram, which appeared on a recent morning in New York papers, indicates that the London press has some inkling of what is proposed:

British steel interests are reported to be planning a thorough reorganization and modernization of the industry in their country. The majority of the blast furnaces now in use, which average only 120 to 150 tons a day, would be scrapped, the reports said, and modern furnaces capable of handling 1000 tons a day substituted. A saving of from 14 to 16 shillings (about \$3.50 to \$4) on coke alone was estimated could be made by this change.

J. Leonard Replogle's report on this subject to a London group which represents capital both inside and outside the steel industry of Great Britain was made about a year ago. In substance, as told in THE IRON AGE of Sept. 4, 1930, it calls for the building of a modern steel plant at seaboard in England at an outlay of \$300,000,000 and with a capacity of about 3,000,000 tons of finished steel a year. Mr. Replogle's report stressed the large amount of pig iron and semi-finished steel Great Britain now imports from the Continent—something like 2,500,000 tons a year, or 60 per cent of the country's iron and steel imports. With 1000-ton blast furnaces (as against the common average of 150 tons today) and a saving of perhaps \$4 a ton by the building of retort coke ovens, together with other modernizing features, it is argued that the proposed plant can go far in competing for the business that now goes to Continental mills. The British sponsors for the project believe that with its important reductions of present costs not only would the country's steel industry gain a new lease of life, but automobile manufacture, ship-building and other consuming industries would expand, giving employment to thousands of workers now in idleness.

While nothing of the magnitude of this \$300,000,000 proposal has been in their minds heretofore, British steel manufacturers have considered from time to time since the war various plans of modernization. A good many of their engineers came to the United States in the years just following the Armistice, but these trips have not been so frequent in the past five or six years. Generally steel company directorates over there were ready to consider modernizing. They granted that, as their engineers reported to them after their American trips, they

could reduce their costs materially by making large outlays. But such was the uncertainty of the whole economic and political outlook in Great Britain, particularly with the increasing threat of labor party domination, that every recommendation for a large capital outlay met the query: "What assurance is there that we can do any more business when we get through spending the additional millions?" It has been a hard question to answer.

Some of the recent newspaper statements concerning the backwardness of steel manufacture in Britain have been too sweeping. During the war large additions were made by some British steel companies and this new plant was modern in design and equipment, though not much was done in building blast furnaces. The war-time addition to open-hearth steel capacity was conspicuous. Generally these new open-hearth furnaces were of 50 to 75 tons' capacity, and another advance was the building of refining mixers in which the silicon was reduced. As compared with 2000 tons a week as the standard output of a 10- or 12-furnace steel plant before the war, the war-time additions stepped up such a group to a performance of 5000 tons a week. This represented a notable advance, even though it falls much short of American outputs.

Consolidation also did not a little to improve the post-war position of British steel makers. Of course, nothing on the American scale of merger-made corporations exists in Britain, the largest having an annual capacity of 1,000,000 tons of steel, while three others range from 250,000 to 400,000 tons; but the consolidations have financed improvements which could not have been undertaken singly by any of the component companies, and have made possible some steps in cost reduction which have partly offset high fuel outlay and the strangulation policy of labor unions.

Without doubt political considerations will be a factor in the carrying out of the program outlined in Mr. Replogle's report. It is not likely that interests able to command \$300,000,000 for such an enterprise would venture it under the auspices of a labor government. More light would be wanted also on the swing toward protection that has been so surprising a development in Great Britain in the past year.

One more thing—and perhaps the most important of all—must be said about Mr. Replogle's proposal. British capital may be found to build modern plant and get costs down five, six or more dollars a ton, but when the low-cost plant was provided there would remain the greater problem of recapturing that portion of the British steel market which

for years, except for the interval of the world war, has been in the hands of the steel makers of the Continent. That struggle would be long and hard and the outcome would hinge on factors which prospectuses are not likely to stress.

Steel Trade Does Relatively Well

STEEL demand has been showing greater vitality than would be expected. It is doing relatively well by any comparison. If in the last few months any steel producers have been uneasy it has been because they could not see how steel could do so well, but the record is now here that it has done relatively well. Production in August was above that of July. In 1923 and 1929 there was progressive and marked decrease in each month of the second half. In 1927 there was no recovery. In 1924 there was a summer dip to a rate less than three-fifths the present rate.

Of course, it is admitted freely that steel tonnage is far below recent records. There is a business depression, and steel has always been particularly sensitive to the state of trade. A plotting of the rate of steel ingot production and the Federal Reserve Board's index of industrial production during the last few years shows that the former fluctuated much more than the latter, running alternately above and below. Then we recall that in 1921 steel production was only 42 per cent of what it had been in the preceding year, although that year had been fourth best in steel production.

Steel has been handicapped in the last few months by a further recession in the general state of trade. In this connection we need not concern ourselves as to whether general trade rounded a turn a few days ago or is going to do so a few days hence or later. It is not so good as it was several months ago.

Steel is seriously handicapped by some of its best customers being almost altogether inactive, and the current tonnage is remarkably large in the circumstances. The automobile industry, distinctly poor in the early months of the year, has grown poorer and poorer still. The railroads are taking relatively little steel, and in some respects this represents a very recent change. According to an American Railway Association report issued late in July, in the first six months of this year the railroads placed in service 49,208 new freight cars, against 32,794 in the same period of last year, which is an increase of almost exactly one-half, whereas now there is practically no freight car building. Oil and gas well drilling is at a very low ebb. According to all accounts, consumption of steel in dwelling house construction and on the farms is very small. Exports both of steel and of manufactures have dwindled greatly.

With this and other general business information before us, but with no information as to what the steel mills were doing, it is safe to assert that a guess as to the rate of steel production would be a very low one, far below the actuality.

Steel is really showing remarkable vitality. It is doing better relative to general conditions than would be expected of it in the light of precedents. It is doing so because two large outlets, line pipe and fabricated structural steel, are active and because miscellaneous

consumption, by the common people if it may be put so, is relatively heavy. It used to be said that steel was largely a "construction material," and with the conception then entertained of what "construction" meant and the present state of things no steel tonnage like that now being made and consumed could possibly be expected.

Common Sense in Germany

WHEN Germany was assessed a heavy reparation for war damages it was contemplated that the German people would have to work hard to pay, but that they would be helped by being relieved of their former great military expense. So far things have worked only partially in that direction. The country has allowed itself to become saddled with a heavy civil expense, the people are not fully working and there is now the situation of upward of three million unemployed and the clear prospect of a heavy deficit in Governmental accounts for this year.

So at the convening of the new Reichstag this month the chancellor proposes to introduce a drastic program of common sense, with the intimation that if the politicians do not see their way to adopt it promptly a dictatorship will.

The program contemplates a curtailment of Governmental personnel, a reduction of salaries, a reduction of industrial wages, an abandonment of doles to unemployed, and indeed an abandonment of unemployment by constraining the idle to go to work in various ways, among others in building houses, for which there is great need in that country.

It is rather strange that instead of bestowing doles the British and German politicians have not previously thought of making their recipients work for them. However, the time is now fully ripe, considering that the world has a plethora of commodities, with consequent low prices and an easiness of credit wherewith to effect the necessary combination between labor and materials and produce houses, electrical plants and transmissions, and the hundreds of other things that are needful in a backward national economy.

The same formula may be even more effectively applied in Great Britain, which is not only deficient in good housing, but also needs to scrap and rebuild much of its industrial plant, which the Germans do not have to do. There is, of course, the obstacle of the sheltered trades in Great Britain and the absence of provision in the British constitution for a dictatorship.

If the Germans and British can get to work on their own affairs, they might forget their loss of trade with the Orient and the Argentine and domestically correct their economic depressions with the cheerful assistance of America. By the time that they have become really busy, the Orientals may have become conscious that industry and trade are better than political disturbance and internecine warfare, and may reappear as buyers.

Thoughts of this kind are running through British minds, but the present Government of the United Kingdom either does not know enough or does not dare. The curse of the world ever since the war has been socialism in one of its various colors and the cajoling of workingmen who in the end become the

most miserable victims. The events of this month in Germany will be of major importance, not only to Germans but also to us.

Overproduction of Medicine Men

By G. R. W.

AMONG the many interesting surprises afforded by the recent metal congress in Chicago, one of the best was not on the program. The feature which greatly impressed many of us was the Adler planetarium almost opposite the convention headquarters on the Lake Shore Drive. In this beautiful dome-shaped building we were able to distill our convention impressions in the quiet artificial twilight. We were also able to recover fully from a bad case of "convention feet."

Seated in the planetarium the lights imperceptibly diminish. The audience becomes hushed and the sky line of Chicago appears on the horizon. The director speaking quietly explains that we are spending these few minutes of cathedral-like quietude so that our eyes may be adjusted from the city glare to the darkness of the night. Suddenly the audience is electrified and spellbound as the entire firmament appears on the azure dome. The heavenly bodies move in their orbits and for once we feel, even if we do not hear, the music of the spheres.

This beautiful calm makes tranquil the sea of convention impressions, and as we journey hotelward we see with beautiful detachment and wonderful objectivity the universe of business with its different economic bodies moving clumsily in their orbits.

We say to ourselves that perhaps some day there will be a business planetarium. This will be a building where we can sit quietly and see economic symbols move across an appropriate background instead of relying on head-line half-truths, incomplete statistics and meaningless pronouncements telling us that conditions are "basically sound." We shall have some eminent internationalist such as Owen D. Young speak to us as the projection instrument flashes above us and shows a pictorial exposition of the P-V line and other old friends.

Perhaps in the new Rockefeller radio project in New York such a building may be erected. From this building the same lecture can be instantaneously duplicated throughout the world. In this manner we should be able to minimize mass hypnotism and economic hysteria.

Above the entrance of each building we may find the following quotation:

A philosophy that takes account only of a "dead" past and a statistical future is incapable of grasping the essential nature of life. In leaving out the ideal element in man's calculations, it leaves out that which distinguishes his behavior from the actions of a planet or a falling stone.

A year ago we had an army of prophets proclaiming the "new era." These oracular gentlemen were like the famous Delphian oracle and equally misleading. We would all like to be "emancipated from idle fancies and the empty din of words and put-

ting our hands to the plow, drive a straight furrow." But we live in a miasma of hokum and hokey. Last year, for example, these pages dissected the well-known figures on automobile production. The conclusions drawn are corroborated by this year's production performance. But many of us forgot these solid truths in the welter of new eraism, and the world, like Nero, merely fiddled when call money went to 20 per cent. Until monasteries and retreats become popular our reposeful thinking will be done most conveniently in the barber's chair with a silent barber or in a duck blind on some lonely shore.

In such solitudes we may well recall that humanity has been divided into two classes: the F. F. V.'s and the Buttonhooks. The first group is the large majority known as the Four-Flushing Veterans. The second group are those silent, effective workers who in their respective places are safely and securely buttoning up whatever their task may be.

This, then, is an appeal for sobriety in public utterance. Free us from warped and distorted statistics. Give us newspapers which no longer interpret figures from Washington as most encouraging in one column, and on some other page have another economist tell us that the same figures mean nothing but gloom. May our trade papers bring to us more articles such as the recent one by the president of the Bergen Point Iron Works. Insulate us from the inflation of the trivial, and help us to bore through the daily bunk to the realities and verities. Above all give us more light, and keener perceptions to see the illuminated truth.

Many Phases of Nitriding

(Concluded from page 993)

min. required for bringing the containers and work up to the working temperature. The limiting factor of the work in picking up nitrogen appears at first to be the surface, because in the early stages the nitrogen will diffuse beneath the surface as rapidly as the surface will take it up. Later on in the progress of the operation the interior of the specimen may come to be the limiting factor.

One speaker referred to making a ductility test of the case-hardened portion of a specimen, by cutting a test piece $\frac{1}{2}$ in. wide and 8 in. long and subjecting it to a progressive bending test. By noting the amount of hardening existing at the point where the break begins, information is obtained as to the ductility in the particular section examined. This method was referred to by Mr. Kinzel as giving a very good qualitative indication, but as leaving much to be desired from the quantitative standpoint.

(To be concluded)

Erratum

The illustration of the two roller-hearth furnaces in the article on "Trends in Heat Treatment of Alloy Steel Castings" in THE IRON AGE of Sept. 11, page 693, should have been credited to the Lebanon Steel Foundry, Lebanon, Pa., instead of to George H. Smith Steel Castings Co., Milwaukee.

Pig Iron Production Shows Decline of 6.8 Per Cent

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INGOT Output Also Off in September — Advances in Steel Prices Fail to Hold — Scrap Prices Drop
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DECLINING 6.8 per cent, pig iron production in September reached the lowest rate since the same month in 1924. Total output was 2,276,770 tons and the daily average was 75,890 tons, compared with 2,523,921 tons, or 81,417 tons a day, in August.

Eighteen furnaces were blown out last month and two were lighted, making a net loss of 16. This marks the sixth consecutive reduction in active capacity and brings the total number of stacks in blast down to 123, or 62 fewer than on April 1, when the uninterrupted recession began.

Considered as a corrective move, bringing production into closer step with consumption, this sharp curtailment is a source of encouragement. Blast furnaces, because of the expense entailed when they are taken out of service, are put out tardily in periods of diminishing business, with the consequence that when that action is finally taken considerable stock iron has accumulated. These stocks must be disposed of before demand again overtakes production. This final stage of adjustment has now been entered.

Steel ingot production also showed a reduction in September, declining 7.3 per cent from August and more than canceling that month's gain over July. The increase in business that developed in September was apparently too small to absorb the surplus stocks of raw steel accumulated in August. It is to be noted, also, that much of the buying last month was for forward delivery and did not result in immediate demands on the mills.

Contracting, in turn, has been checked by the realization that the improvement in steel bookings in September was overestimated. In some instances, negotiations for forward commitments have been dropped because of failure of mills and buyers to come to agreement on prices. Renewed price pressure, in fact, has become a feature of the reversal in sentiment.

Recent advances in bars and black and blue annealed sheets have failed to hold, while hot rolled strip and skelp are down \$1 and \$2 a ton respectively. Tin plate has been reduced 25c. a base box to \$5, Pittsburgh, the lowest level since March, 1923. This change was influenced in part, no doubt, by the fall of pig tin, which is now at the lowest figure since 1921, but it also represented an effort to stabilize a

price that has been subject to sharp concessions in recent months.

Scrap, always a closely watched barometer, has developed further weakness. Heavy melting grade at Pittsburgh has declined 50c. a ton for the second time in as many weeks. Recessions of 50c. at Chicago and St. Louis and 25c. at Cleveland indicate that the trend is no longer localized.

While the brief spurt in steel demand in September failed to bring the long awaited "recovery," current specifications, as contrasted with forward commitments, have shown little diminution. Steel ingot output for the country at large averages close to 58 per cent, compared with 61 per cent a week ago.

Tin plate orders are declining seasonally and the approach of cold weather may interfere with the laying of pipe lines, thus adversely affecting line pipe output, but these losses will be offset, at least in part, by winter rail rollings.

The Santa Fe has placed orders for 61,200 tons of rails and will soon purchase 20,000 tons of track fastenings. The Pere Marquette has bought 13,650 tons of rails. Inquiry by the New York Central for 175,000 tons has been postponed.

Automobile production in October will show little, if any, reduction from that of September, according to current estimates. Output by the Ford Motor Co. last month was 97,885 units, compared with 99,142 in August—a better showing than was generally expected.

New structural steel projects, at 49,000 tons, are the largest since the first week of September and more than double the total of a week ago. Awards, at 30,500 tons, compare with 15,000 tons and 21,000 tons in the two previous weeks.

Restriction of crude oil output has removed 20,000 tons of prospective storage tank work from the market.

THE IRON AGE composite price for finished steel has declined from 2.156c. to 2.142c. a lb., returning to the low for the year, first reached in August. The scrap composite has receded from \$13.58 to \$13.25 a gross ton, now being only 17c. above the low level of last July. Pig iron remains at \$16.38 a gross ton.

PITTSBURGH

October Fails to Bring Improvement— Scrap Prices in Sharp Decline

PITTSBURGH, Oct. 7.—The beginning of the new quarter has brought no further improvement to the Pittsburgh district steel industry. Instead, the past week has intensified the realization that improvement last month was overestimated, and the accompanying reversal of sentiment has been unfavorable to continued forward buying by large consumers. In some cases negotiations for forward contracting have been dropped because of failure of mills and consumers to come to agreement on prices.

Some of the larger companies are still trying to hold recent quotations, but shading has become more common on a number of products and attempts to secure higher prices on flat-rolled steel products now seem to have failed. To a lesser extent this has been the experience in the case of steel bars, although only one or two makers are openly soliciting business at less than 1.65c., Pittsburgh. Sheet prices have reverted to August levels, in spite of the fact that mills were able to book a fair amount of tonnage during September at prices \$2 a ton higher. Hot-rolled strip is also quoted at reductions of \$1 a ton, since the special inside price formerly available only to a few large buyers has been extended more generally to the trade. On cold-rolled strip quotations higher than 2.35c., Pittsburgh, have virtually disappeared.

The only official price development of the week was the announcement on tin plate, which brought a reduction of 25c. a base box for delivery through the first half of 1931. At \$5 a base box, Pittsburgh, tin plate is at the lowest level since early in 1923. However, the price is more in line with current quotations on pig tin, and the early announcement possibly will deter consumers of tin plate from inventory reduction during the remainder of the year.

With few exceptions, specifications for steel products were light in the last week. Present open-hearth production is scarcely sustained by the requirements of finishing mills. Fairly good demand for structural steel, line pipe and plates is helping considerably, as production of bars, sheets, strip steel, wire products and track accessories is under 50 per cent. Tin plate schedules have also fallen off seasonally.

No appreciable change in the status of leading steel consuming industries is reported. The trend of automobile production still seems to be downward. Railroad buying has not got under way in the territory served by Pittsburgh mills. Line pipe buying is apparently at an end for the present year, leaving mills booked at a fair

Beginning of fourth quarter fails to bring further steel improvement. September gains possibly overestimated.

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Prices on bars and sheets weaken, nullifying recent efforts toward stabilization at higher levels.

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Tin plate price reduced to \$5 a base box, lowest quotation since early in 1923.

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No appreciable change in the status of leading consuming industries as affecting steel demands.

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Sharp decline in scrap prices. Heavy melting steel down 50c. a ton, a drop of \$1 in two weeks.

rate for at least two months or even longer in some instances. Activity continues in the structural steel market and some barge business is in sight. A number of miscellaneous consumers of steel are under contract for the remainder of the year at prices favorable to them and may be expected to restrict their releases according to the general state of business. Jobbers might be placed in the same category.

The pig iron market continues dull. Scrap prices have declined from 50c. to \$1 a ton on most of the principal grades. This represents the second decline of 50c. a ton in No. 1 steel in as many weeks.

Pig Iron

The pig iron market, particularly in the immediate Pittsburgh district, seems to have developed further weakness in the last few days as sellers have grown more aggressive in seeking business. Foundries in the district are particularly apathetic toward forward needs, and in some cases have turned down opportunities to buy iron under the prevailing market quotations. Buffalo iron at \$16, base, has been offered in the Youngstown and Pittsburgh districts, but no sales are reported. Cleveland iron has also failed to become a definite factor in the Valley market.

No sales are reported in the territory that might warrant quoted prices of less than \$17, Valley furnaces, on basic iron, \$17.50 on foundry, and \$18 on malleable and Bessemer. With the local Pittsburgh merchant furnace offering all these grades at base prices

50c. over the Valley market, delivered prices in this district are naturally somewhat lower because of the freight rate advantage. No new inquiry has come before the market, and there has been no sustained gain in shipments. Buying is still of a hand-to-mouth character for immediate shipment.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$17.00
Bessemer	18.00
Gray forge	17.00
No. 2 foundry	17.50
No. 3 foundry	17.00
Malleable	18.00
Low phos., copper free	\$26.66 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	\$17.50
No. 2 foundry	18.00
No. 3 foundry	17.50
Malleable	18.50

Freight rates to points in Pittsburgh district range from 63c. to \$1.13.

Semi-Finished Steel

Shipments of billets, slabs and sheet bars to non-integrated steel companies this month show no particular improvement over September, and new buying is lacking. The price has been given no adequate test in recent weeks and remains nominally quotable at \$31, Pittsburgh or Cleveland. Forging billets are dull and unchanged at \$36, Pittsburgh. Fourth quarter contracting was generally carried out at that figure. A few makers are shipping somewhat heavier tonnages of wire rods than they did during the summer, but business is still very quiet. The price seems to be holding at \$36, Pittsburgh or Cleveland.

Bolts, Nuts and Rivets

With the principal users of bolts and nuts in a depressed condition, specifications of local mills are very light and operations average about 40 per cent of capacity. An encouraging factor in the situation is the comparative stability of prices, which are holding at 73 per cent off list for bolts and nuts and 70, 10 and 5 per cent off for small rivets. Large rivets are unchanged at \$2.75 a 100 lb.

Bars, Plates and Shapes

Buyers continue to show interest in forward commitments. In many cases contracts for the fourth quarter have been entered at prices under the current levels of 1.65c., Pittsburgh, on bars, and 1.60c. on plates and shapes, but tonnage coming out now is developing a steadier price structure. This is particularly true when consumers make an effort to cover their requirements for the early part of next year, as producers are reluctant to allow present prices to continue beyond the

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous,
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Oct. 7, 1930	Sept. 30, 1930	Sept. 9, 1930	Oct. 8, 1929
No. 2 fdy., Philadelphia.....	\$18.76	\$18.76	\$19.76	\$21.26
No. 2, Valley furnace.....	17.50	17.50	18.00	18.50
No. 2 Southern, Cin'ti.....	15.19	15.19	15.69	17.19
No. 2, Birmingham.....	14.00	14.00	14.00	14.50
No. 2 foundry, Chicago.....	17.50	17.50	17.50	20.00
Basic, del'd eastern Pa.....	17.75	17.75	18.75	19.75
Basic, Valley furnace.....	17.00	17.00	18.00	18.50
Valley Bessemer, del'd P'gh..	19.76	19.76	20.26	20.76
Malleable, Chicago.....	17.50	17.50	17.50	20.00
Malleable, Valley.....	18.00	18.00	18.50	19.00
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	94.00	94.00	94.00	105.00

Rails, Billets, Etc., Per Gross Ton:

Rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh..	31.00	31.00	31.00	35.00
Sheet bars, Pittsburgh.....	31.00	31.00	31.00	35.00
Slabs, Pittsburgh.....	31.00	31.00	31.00	35.00
Forging billets, Pittsburgh...	36.00	36.00	36.00	40.00
Wire rods, Pittsburgh.....	36.00	36.00	36.00	40.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	1.60	1.70	1.70	1.85

Finished Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.60	1.65	1.60	1.90
Bars, Chicago.....	1.70	1.70	1.70	2.05
Bars, Cleveland.....	1.65	1.65	1.70	1.95
Bars, New York.....	1.93	1.98	1.93	2.24
Tank plates, Pittsburgh.....	1.60	1.60	1.60	1.95
Tank plates, Chicago.....	1.70	1.70	1.70	2.05
Tank plates, New York.....	1.88	1.88	1.88	2.22½
Structural shapes, Pittsburgh..	1.60	1.60	1.60	1.90
Structural shapes, Chicago...	1.70	1.70	1.70	2.05
Structural shapes, New York...	1.85½	1.85½	1.80½	2.19½
Cold-finished bars, Pittsburgh..	2.10	2.10	2.10	2.30
Hot-rolled strips, Pittsburgh..	1.60	1.65	1.65	1.90
Cold-rolled strips, Pittsburgh..	2.35	2.35	2.35	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Finished Steel,

Per Lb. to Large Buyers:	Oct. 7, 1930	Sept. 30, 1930	Sept. 9, 1930	Oct. 8, 1929
Sheets, black, No. 24, P'gh...	2.40	2.45	2.40	2.75
Sheets, black, No. 24, Chicago				
dist. mill.....	2.55	2.55	2.50	2.95
Sheets, galv., No. 24, P'gh...	3.00	3.00	3.00	3.50
Sheets, galv., No. 24, Chicago				
dist. mill.....	3.10	3.10	3.10	3.60
Sheets, blue, No. 13, P'gh...	2.05	2.15	2.05	2.35
Sheets, blue, No. 13, Chicago				
dist. mill.....	2.25	2.25	2.25	2.45
Wire nails, Pittsburgh.....	2.00	2.00	2.00	2.45
Wire nails, Chicago dist. mill..	2.10	2.10	2.10	2.45
Plain wire, Pittsburgh.....	2.30	2.30	2.30	2.40
Plain wire, Chicago dist. mill..	2.35	2.35	2.35	2.40
Barbed wire, galv., Pittsburgh	2.70	2.70	2.70	3.10
Barbed wire, galv., Chicago				
dist. mill.....	2.85	2.85	2.85	3.15
Tin plate, 100 lb. box, P'gh...	\$5.00	\$5.25	\$5.25	\$5.35

Old Material, Per Gross Ton:

Heavy melting steel, P'gh....	\$14.75	\$15.25	\$15.75	\$17.25
Heavy melting steel, Phila...	13.00	13.00	13.00	16.00
Heavy melting steel, Ch'go...	12.00	12.50	12.50	14.50
Carwheels, Chicago.....	13.50	13.50	13.50	14.00
Carwheels, Philadelphia.....	15.00	15.00	15.00	16.50
No. 1 cast, Pittsburgh.....	13.25	13.50	13.50	16.00
No. 1 cast, Philadelphia.....	13.00	13.00	13.00	16.00
No. 1 cast, Ch'go (net ton)...	11.00	11.00	11.50	14.50
No. 1 RR. wrot., Phila.....	15.00	15.00	15.00	16.00
No. 1 RR. wrot., Ch'go (net)	9.25	10.00	10.00	14.00

Coke, Connellsville.

Per Net Ton at Oven:				
Furnace coke, prompt.....	\$2.60	\$2.60	\$2.60	\$2.65
Foundry coke, prompt.....	3.50	3.50	3.50	3.75

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	10.12½	10.12½	11.12½	18.12½
Electrolytic copper, refinery..	9.75	9.75	10.50	17.75
Tin (Straits), New York....	27.37½	28.75	29.87½	43.37½
Zinc, East St. Louis.....	4.20	4.25	4.30	6.80
Zinc, New York.....	4.55	4.60	4.65	7.15
Lead, St. Louis.....	5.10	5.35	5.35	6.70
Lead, New York.....	5.25	5.50	5.50	6.90
Antimony (Asiatic), N. Y....	7.50	7.50	7.75	8.50

end of the quarter. Local structural fabricators are figuring on a heavier tonnage than they have at any recent period. Considerable bridge work is being placed. A fair amount of plate business is also before the market, although the heavier consuming industries, such as the railroad car builders, are taking very little tonnage. Two oil companies have placed large tank projects in the last few days, and the barge market continues to have an undertone of activity.

Bars are quieter, as the reinforcing business is tapering off seasonally and the automobile industry is accounting for very little tonnage. Little material is coming to the cold-finning mills, which are not running at more than 40 per cent of capacity. Agricultural implement makers served by Pittsburgh mills are not yet beginning to specify very freely. Other consuming lines are dull.

Tubular Goods

Pipe operations in the Pittsburgh and Valley districts are spotty, the principal activity being the rolling of line pipe tonnages which are unevenly distributed among the various companies, as well as among individual departments of the same companies. Generally speaking, electric-weld and seamless units are engaged at a better

rate than lapweld and butt-weld capacity, although producers of lapweld pipe in very large sizes still have fair order books. Some makers of standard pipe report slightly heavier quotations, but attribute this to seasonal activity rather than to the beginning of any definite upward movement. Oil country demand is light, and mechanical tubing is exceptionally dull. Boiler tubes are moving in fair volume.

Wire Products

Shipments to most companies are running ahead of the July-August rate, and one or two companies report rather substantial improvement in business during recent weeks. Jobbers who allowed their inventories to reach rock bottom during the summer months have ordered out some material, and the close of the quarter brought heavier specifications from users in other lines. Prices are fairly well maintained at \$2 a keg, Pittsburgh, for nails, and 2.30c., Pittsburgh, for manufacturers' wire. In outside districts, particularly the East, nail prices are not as well maintained as they are in the immediate Pittsburgh district.

Sheets

The buying movement in this market, which reached fairly large pro-

portions in September, has now generally subsided and business has returned to the hand-to-mouth character which has been in evidence for about a year. Considerable tonnage was placed on company books last month for shipment over the remainder of the year, the leading interest having had the best forward orders in more than six months. A feature of recent buying, which is not altogether encouraging, is the fact that many prospective purchasers have objected to definite time limits in their contracts with the likelihood that they merely wish to be covered in case of any sudden change in business.

Specifications for sheets last week were lighter than the September average, and the average operating rate for the industry is again under 50 per cent. Specifications from the automobile industry are very light, and so far this month seem to be tapering off rather than increasing. Considerable talk is heard of model changes among important makers, which does not indicate any marked expansion in production during the quarter.

Prices are weaker and some of the largest makers of sheets are discouraged over the failure of recent efforts to raise prices. While the principal makers of black sheets are still quoting 2.45c., Pittsburgh, tonnage is be-

THE IRON AGE COMPOSITE PRICES

Finished Steel		Pig Iron	Steel Scrap				
Oct. 7, 1930	2.142c. a Lb.	\$16.38 a Gross Ton	\$13.25 a Gross Ton				
One week ago	2.156c.	16.38	13.58				
One month ago	2.142c.	16.88	13.75				
One year ago	2.384c.	18.29	15.92				
Based on steel bars, beams, tank plates, wire, rails, black pipe and sheets. These products make 87 per cent of the United States output.		Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.					
Based on heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.							
HIGH		LOW		HIGH		LOW	
1930.....	2.362c., Jan. 7	2.142c., Aug. 26	\$18.21, Jan. 7	\$16.38, Sept. 30	\$15.00, Feb. 18	\$13.08, July 1	1
1929.....	2.412c., April 2	2.362c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3	3
1928.....	2.391c., Dec. 11	2.314c., Jan. 2	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2	2
1927.....	2.453c., Jan. 4	2.293c., Oct. 25	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22	1
1926.....	2.453c., Jan. 5	2.403c., May 18	21.54, Jan. 5	19.46, July 13	17.25, Jan. 5	14.00, June 1	1
1925.....	2.560c., Jan. 6	2.396c., Aug. 18	22.50, Jan. 13	18.96, July 7	20.83, Jan. 13	15.08, May 5	1

ing booked at 2.35c., and some sellers are willing to meet this figure. Automobile body sheets are weak at 3.50c., while light plates and blue annealed sheets are better maintained at 2c. and 2.15c., Pittsburgh. No change has been made in the price of terne plate and tin mill black, following the recent decline in the official price of tin plate.

Tin Plate

The leading maker has reduced the price of tin plate 25c. a base box to \$5, Pittsburgh, effective Oct. 1. The price applies only through the first half of 1931, and the announcement came out about six weeks ahead of the usual time. The old price has been effective since Dec. 31, 1929, but had been subject to sharp concessions in recent months. The \$5 price is the lowest since March, 1923, when the price of tin plate was advanced from \$4.95 to \$5.50 a base box. The rather sharp decline in price at this time is expected to obviate the necessity of a further change at the end of the year. The reduction at the beginning of this year was prompted by price cutting at the end of 1929. Independent producers of tin plate have generally adopted the \$5 price. Tin plate operations declined sharply last week to about 60 per cent for the industry as a whole, with the leading interest running at a slightly higher rate.

Strip Steel

Specifications for hot-rolled strip were not as heavy with a number of makers last week as they were during September, but still show a fair improvement over the low levels of July and August. Little tonnage is coming from the automobile industry, and diversified consumers are specifying only for their immediate needs and consequently in small tonnage. Little forward buying is in evidence, as most of the consumers who ordinarily buy on the contract basis are now covered for the remainder of the year. Prices are weaker on hot-rolled material as leading manufacturers are now meeting quotations of 1.60c. and 1.70c., Pittsburgh, on the wide and narrow sizes of strip respectively. Prices \$1 a ton higher are to be had only on small tonnages. Cold-rolled strip is fairly

well maintained at 2.35c. to 2.45c., Pittsburgh or Cleveland.

Coal and Coke

Faced with a considerable surplus of both coke and slack on railroad tracks, the market is in a rather depressed condition, particularly on slack. Steam slack has been sold at 45c., or lower, a net ton, although such figures are strictly confined to distress tonnage. The coke market has retained more price strength, as sellers are not anxious to take a loss on this material. The furnace grade is quotable at \$2.60 to \$2.65, Connellsville, while foundry coke ranges from \$3.25 to \$4.85, the latter figure applying to the premium grades. Prices on both steam and coking coal are weaker.

Old Material

In the absence of sustained buying, as well as shipping instructions, the scrap market in the Pittsburgh district has declined sharply on the prin-

cipal grades. Small purchases of machine shop turnings during the week brought this grade down \$1 a ton under recent levels, while the acid open-hearth grades have generally declined on small miscellaneous sales. No mill purchase is reported to establish the market on No. 1 heavy melting steel, although the Pennsylvania Railroad list is reported to have gone to a buyer outside the immediate district at a few cents over \$15. In the meantime, the offering prices of dealers have dropped under the \$15 level, and other grades have reacted in sympathy. This week's developments have brought the scrap market down a full dollar in the last fortnight, and the trend seems likely to continue downward unless the market is bolstered by substantial mill purchases in the next few days.

With open-hearth operations in the district showing no improvement and barely holding their own at several points, scrap consumption is low and seems to be again lagging behind production in spite of the limited operations of the principal industrial producers.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel..	\$14.50 to \$15.00
No. 2 heavy melting steel..	12.00 to 12.50
Scrap rails	14.25 to 14.75
Compressed sheet steel....	14.50 to 15.00
Bundled sheets, sides and ends	13.50 to 14.00
Cast iron carwheels.....	14.00 to 14.50
Sheet bar crops, ordinary..	15.00 to 15.50
Heavy breakable cast.....	10.50 to 11.00
No. 2 railroad wrought....	14.50 to 15.00
Hvy. steel axle turnings....	12.00 to 12.50
Machine shop turnings....	7.00 to 7.50

Acid Open-Hearth Grades:	
Railr. knuckles and couplers	17.00 to 17.50
Railr. coil and leaf springs	17.00 to 17.50
Rolled steel wheels.....	17.00 to 17.50
Low phos. billet and bloom ends	19.00 to 20.00
Low phos. mill plates....	16.50 to 17.00
Low phos. light grades....	16.50 to 17.00
Low phos. sheet bar crops	17.00 to 18.00
Heavy steel axle turnings..	12.00 to 12.50

Electric Furnace Grades:	
Low phos. punchings....	16.50 to 17.00
Heavy steel axle turnings..	12.00 to 12.50

Blast Furnace Grades:	
Short shoveling steel turnings	8.00 to 8.50
Short mixed borings and turnings	8.00 to 8.50
Cast iron borings.....	8.00 to 8.50

Rolling Mill Grades:	
Steel car axles.....	20.50 to 21.00

Cupola Grades:	
No. 1 cast.....	13.00 to 13.50
Rails 3 ft. and under....	16.00 to 16.50

Warehouse Prices, f.o.b. Pittsburgh

	*Base per Lb.
Plates	2.85c.
Structural shapes.....	2.85c.
Soft steel bars and small shapes...	2.75c.
Reinforcing steel bars.....	2.75c.
Cold finished and screw stock—	
Rounds and hexagons.....	3.35c.
Squares and flats.....	3.85c.
Bands	3.10c.
Hoops	4.10c.
Black sheets (No. 24), 25 or more bundles	3.25c.
Galv. sheets (No. 24), 25 or more bundles	3.85c.
Light plates, blue annealed (No. 10), 1 to 24 plates.....	2.50c.
Blue annealed sheets (No. 13)....	2.65c.
Galv. corrug. sheets (No. 28), per square	4.25c.
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 and 10 per cent off list	
Machine bolts, 100 count, 60 and 10 per cent off list	
Carriage bolts, 100 count, 60 and 10 per cent off list	
Nuts, all styles, 100 count, 60 and 10 per cent off list	
Large rivets, base per 100 lb.	\$3.30
Wire, black, soft ann'l'd, base per 100 lb.....	\$2.60 to 2.70
Wire, galv. soft, base per 100 lb.	3.20 to 3.30
Common wire nails, per keg	2.35
Cement coated nails, per keg	2.65 to 2.80

*On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 3999 lb.

CHICAGO

Santa Fe Orders 61,200 Tons of Rails— Steel Outlook Hazy

CHICAGO, Oct. 7.—Cross-currents continue to blur the outlook in the local iron and steel market. It is now evident that unless a turn in the oil and gas industries occurs, steel mill support from these sources will soon be a diminishing factor. Close to 20,000 tons of prospective tank work has been removed from the market because regulation of crude oil output will remain in effect in Oklahoma, and there is evidence at hand that releases against oil and gas line contracts are not so heavy as several weeks ago. This last situation may be due to the approach of winter, which precludes field work in the Central and Northern States.

On the other hand, orders for new rail programs are making their appearance, though tonnages involved are well below the totals of a year ago. In one instance, however, the budget apportionment for 1931 is larger than that of a year ago and it is stated that additional purchases may be made at later dates. In any event, it is fairly reasonable to expect that new rail tonnages will tend to bolster ingot output, which at the moment is wavering, it having dropped two points to 57 per cent of capacity.

Word is spreading from Detroit and other cities where automobiles are manufactured that the advantage in new business is no longer with the cheaper cars and that a small gain is taking place in orders for medium and high-priced cars. The industry takes this as a favorable sign, as on previous occasions changes in public interest from the low to the medium-priced car field have been the forerunners of improvement in general sales.

Miscellaneous sales and specifications for finished steel products are a shade above the level of a week ago. The number of orders is well maintained, indicating that such business as is going is well diversified.

The Illinois Steel Co. has banked a stack at South Works, bringing the count of active steel mill furnaces in this district to 15.

Pig Iron

Developments in this market are of little importance beyond the fact that shipments continue their slow but steady increase. The price structure of Northern iron is well grounded at \$17.50 a ton, f.o.b. local furnaces. It is significant that more buyers are taking the stand that prices are near rock bottom and they are pressing harder for commitments for delivery after the turn of the year. Southern iron is moving into this territory in car lots, and new sales are of little moment. Quotations on charcoal iron

Santa Fe enters market for 60,000 tons of rails, somewhat below its initial inquiry a year ago.

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Releases for oil and gas line fabrication likely to be diminishing factor in plate market.

* * *

Ingot operating rate in district down two points to 57 per cent of capacity.

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Illinois Steel Co. banks blast furnace, bringing active steel mill stacks in district to 15.

* * *

Scrap market weakens. Heavy melting steel off 50c. a ton.

up and ready for shipment on existing orders totals 225 miles.

Word comes from Oklahoma that regulation of output of crude oil will continue in effect, with the result that about 20,000 tons of tank work will not be needed, and this tonnage is therefore removed from the market.

Offering some encouragement, however, are 3000 tons of tank plates on a new inquiry and several thousand tons of like work which may be placed in the very near future. Reports that about five railroad car inquiries are in the making by Western railroads appear to be without foundation, although one railroad is definitely said to have outlined a new equipment program for the coming year.

Prices for plates are steady at 1.70c. a lb., Chicago, with the quotation of 1.75c. holding only on mixed carlot business.

Structural Material

Preliminary estimates of the steel needed for Chicago's subway, extensions to the elevated system and surface lines, together with other improvements which will be necessitated by this program, place the tonnage between 250,000 and 400,000. This is to be spread over a 10-year period, but it is estimated that about 100,000 tons will be needed for the first two years' work. Although plans are well advanced, there are a few major points in design that are unsettled, and the trade thinks it may be early spring before the first figures will be taken.

Fresh inquiries, including 9000 tons for a highway bridge across the Ohio River at Evansville, Ind., total 13,000 tons, but awards are practically negligible as gaged by the capacities of local shops. Most quotations for structural shapes are at 1.70c. a lb., Chicago, with occasional mixed carlots bringing 1.75c.

Bars

Specifications for mild steel bars are spotty, though in the aggregate they have registered a slight gain in the past week. New buying is for the most part at close range. Most users, even those who take the larger tonnages, are pressing for delivery, indicating that shipments to them are close to actual consumption and that stocks are low. The iron bar market is without feature.

Operations at alloy steel bar mills average 50 per cent of capacity, registering no gain over the previous week. Prices for rail steel bars are holding at 1.65c. a lb., district mill. New orders show a moderate gain and the outlook, as viewed by sellers, has improved much in the past few weeks.

are steady at \$24, furnace, but consumption is low. Four merchant furnaces are in blast in this district.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25.....	\$17.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75.....	18.00
Malleable, not over 2.25 sil	17.50
High phosphorus	17.50
Lake Super. charcoal, sil. 1.50	27.04
S'th'n No. 2 fdy.....	17.51
Low phos., sil. 1 to 2, copper free	\$28.50 to 29.20
Silvery, sil. 8 per cent....	26.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Coke

Shipments of by-product foundry coke cannot now be taken as an indication of foundry activity for the reason that the approach of winter is resulting in movement of this commodity for heating purposes. The price is steady at \$8 a ton, f.o.b. local ovens.

Ferroalloys

This market is very quiet. Shipments in September showed a moderate gain over those of the preceding month, and deliveries are creeping forward slowly as October advances.

Plates

Line pipe construction, which has been the chief support of the plate market in this district, may soon taper off. The Milwaukee pipe maker shipped 89,800 tons of pipe in September, which established a record over the previous high month, July. It is significant, however, that pipe made

Consumers still give evidence of their determination to hold stocks to the minimum by ordering in small lots for immediate shipment.

Wire Products

Tonnage ordered out by dealers is lighter this week than last, but specifications from the manufacturing trade have made a gain, so the net result is that shipments still stand at 50 per cent of capacity. It is worthy of note that the number of orders being received from week to week compares favorably with the number received a year ago. However, they are small in the aggregate. The inference is that most users are finding need for limited tonnages and that stocks in their hands are low.

Cold-Rolled Strip

Larger releases carried operations upward to about the middle of the week, but in recent days demand has fallen off, and output now stands between 35 and 40 per cent of capacity.

Rails and Track Supplies

The Santa Fe has placed orders for 61,200 tons of standard-section rails and the Pere Marquette has divided 13,650 tons. The bulk of the Santa Fe business went to the Colorado Fuel & Iron Co., which will furnish 47,600 tons, while the Illinois Steel Co. and the Inland Steel Co. will each roll 6800 tons. Four mills shared the Pere Marquette order, with the following division: Algoma Steel Co. of Canada, 3600 tons; Bethlehem Steel Co., 2000 tons; Illinois Steel Co., 4000 tons, and Inland Steel Co., 4050 tons. The Santa Fe will later buy 20,000 tons of track supplies. The light rail market is quiet in the West, but is said to be moderately active in the anthracite coal regions. Rail mill operations, which have been wavering for several weeks, are steadier, but the rate is low.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. Per lb.: Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.07½c. to 2.15c.; angle bars, 2.75c.

Cast Iron Pipe

Milwaukee has accepted the bid of \$44.40 a ton, delivered, for 1000 tons of 16-in. pipe. This price is equivalent to \$36 a ton, Birmingham. The 1931 budget at Milwaukee is larger than for the current year and includes the laying of 50 miles of new mains. Other awards include 200 tons by Hillsboro, Wis.; 300 tons by Buffalo; 5000 ft. by Lewistown, Ill., and 10,000 ft. by Harrisburg, S. D. Chicago is in the market for 550 tons of 8 to 12-in. pipe, and Canton, Ohio, opened bids Oct. 8 on 5000 ft. of 6-in. pipe. St. Louis County, Mo., has a \$1,500,000 project.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$44 to \$45; 4-in., \$47 to \$48; Class A and gas pipe, \$3 extra.

Bolts, Nuts and Rivets

Increased activity in specifications noted a week ago has not been sus-

tained, and sellers are now pinning their hopes on promises by a number of agricultural machinery manufacturers that November will be the time when production will get under way for machinery that is to be delivered in the spring.

Sheets

Backlogs are light and the outlook is very uncertain. Although operations are variable because of the spotty character of current business, output is holding to the average of 60 per cent of capacity. The roofing trade, which last week showed rather marked revival, has fallen back. Manufacturers of containers and small tanks are taking sheets in steady but relatively small tonnages.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.60c.; No. 24 galv., 3.15c. to 3.25c.; No. 10 blue ann'l'd, 2.15c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Reinforcing Bars

In the absence of breadth of inquiry, dealers are concentrating attention on road work and a few large tonnages that are up for figures. The International House at the University of Chicago, requiring 650 tons, may be let in a few days, and keen interest is being shown in the 800 tons to be used in the Eddystone Apartments, foundations for which are under way. Legal matters which have been holding back progress on Chicago's outer drive have been cleared, and this development, including a new bridge and extensive approaches, will soon be under way. Although the season is late, warehouses are expecting additional tonnages for Illinois road work. However, plans for road building are so extensive that undoubtedly some of the steel needed will not be taken before open weather next spring.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes.....	3.00c.
Soft steel bars.....	2.90c.
Reinforc'g bars, billet steel—	
Less than 5 tons.....	2.85c.
5 tons to 30 tons.....	2.45c.
30 tons to 200 tons.....	2.00c.
200 tons and over.....	1.75c.
Rail steel reinforcement—	
Less than 5 tons.....	2.50c.
5 tons to 30 tons.....	2.10c.
30 tons and over.....	1.50c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.35c.
Flats and squares.....	3.85c.
Bands (¾ in. in Nos. 10 and 12 gages).....	3.10c.
Hoops (No. 14 gage and lighter).....	3.65c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.35c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes (¾ in. and larger).....	3.55c.
Track bolts.....	4.55c.
Rivets, structural.....	4.00c.
Rivets, boiler.....	4.00c.
	Per Cent Off List
Machine bolts.....	60 and 10
Carriage bolts.....	60 and 10
Coach or lag screws.....	60 and 10
Hot-pressed nuts, sq., tap. or blank, 60 and 10	
Hot-pressed nuts, hex., tap. or blank, 60 and 10	
No. 8 black ann'l'd wire, per 100 lb.	\$3.45
Com. wire nails, base per keg.....	\$2.30 to 2.55
Cement c'd nails, base per keg.....	2.30 to 2.55

Old Material

Low consumption and the fact that for weeks scrap has been in a buyers' market have resulted in lower prices for many of the most important grades. Heavy melting steel is off 50c. a ton, following consumer purchases at \$12.50 a gross ton, delivered, with brokers able to buy this grade at \$12. Although incoming tonnages have not grown, users, having large stocks on hand, are in a good position to resist sales effort and they are already building up resistance against \$12.50 heavy melting steel. Cast iron borings are 25c. lower than a week ago. Quotations on malleable are unstable. The drift of prices to lower levels now appears to be gaining headway.

Prices deliv'd Chicago district consumers: Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$12.00 to \$12.50
Shoveling steel.....	12.00 to 12.50
Frogs, switches and guards, cut apart, and misc. rails	12.50 to 13.00
Hydraulic compressed sheets	9.75 to 10.25
Drop forge flashings.....	8.60 to 9.00
No. 1 busheling.....	9.50 to 10.00
Forg'd cast and r'l'd steel carwheels.....	15.00 to 15.50
Railroad tires, charg. box size.....	15.50 to 16.00
Railroad leaf springs cut apart.....	15.50 to 16.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	13.50 to 14.00
Coil springs.....	16.00 to 16.50
Electric Furnace Grades:	
Axle turnings.....	11.25 to 11.75
Low phos. punchings.....	13.00 to 13.50
Low phos. plates, 12 in. and under.....	13.00 to 13.50
Blast Furnace Grades:	
Axle turnings.....	8.00 to 8.50
Cast iron borings.....	6.50 to 7.00
Short shoveling turnings..	6.25 to 6.75
Machine shop turnings....	5.50 to 6.00
Rolling Mill Grades:	
Iron rails.....	13.00 to 13.50
Rerolling rails.....	14.50 to 15.00
Cupola Grades:	
Steel rails, less than 3 ft..	14.00 to 14.50
Steel rails, less than 2 ft..	14.25 to 14.75
Angle bars, steel.....	13.00 to 13.50
Cast iron carwheels.....	13.50 to 14.00
Malleable Grades:	
Railroad.....	13.50 to 14.00
Agricultural.....	12.50 to 12.75
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00
	Per Net Ton
Rolling Mill Grades:	
Iron angle and splice bars.	12.00 to 12.50
Iron arch bars and transoms.....	13.00 to 13.50
Iron car axles.....	21.50 to 22.00
Steel car axles.....	15.00 to 15.50
No. 1 railroad wrought... 9.25 to 9.75	
No. 2 railroad wrought... 10.75 to 11.25	
No. 1 busheling.....	7.50 to 8.00
No. 2 busheling.....	6.00 to 6.50
Locomotive tires, smooth..	13.50 to 14.00
Pipes and flues.....	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast.....	11.00 to 11.50
No. 1 railroad cast.....	10.00 to 10.50
No. 1 agricultural cast....	9.50 to 10.00
Stove plate.....	8.50 to 9.00
Grate bars.....	8.50 to 9.00
Brake shoes.....	8.50 to 9.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

A. Kasle Co. has been incorporated to conduct a scrap iron and steel brokerage business, with offices in the General Motors Building, Detroit, succeeding the business of Abe Kasle, who has been in the brokerage business at Detroit for six years. Officers of the company are Abe Kasle, president and treasurer; Burt D. Howe, vice-president.

CLEVELAND

No Further Gains in Steel Business— Pere Marquette Orders Rails

CLEVELAND, Oct. 7.—While the demand for finished steel this month is maintained, there seems to be no further increase, except in sheets, which are moving somewhat better than last month. Business of consuming industries in this territory shows little, if any, improvement and few are operating at more than 50 per cent of capacity. Steel plant operations in Cleveland are unchanged at 50 per cent of ingot capacity.

Some of the mills have closed fourth quarter contracts with most of their consumers for steel bars, plates and structural material, buyers covering conservatively for the amount of steel they expect to need during the remainder of the year. An increasing interest in contracts is being shown by some consumers of sheets and strip steel, mostly large buyers in the automotive field, who evidently feel that prices on these products will go no lower and that, if they make commitments, they will be at an advantage should there be an advance. Enough contract business has been taken in bars, plates and shapes at the ruling prices to indicate that these prices will prevail throughout the quarter.

When mills in September made concessions on hot-rolled strip they had some hope of getting the market back to the generally quoted prices for the last quarter. However, the larger consumers have contracted for the current quarter at 1.60c., Pittsburgh, for wide strip and at 1.70c. for narrow, and these quotations have become ruling prices except for small lots.

Rails and Track Supplies

The Pere Marquette railroad has placed 13,500 tons of rails, of which 3500 tons are for Canada. It is understood this tonnage has been divided among the Illinois Steel Co., Bethlehem Steel Co., Inland Steel Co. and Algoma Steel Co. Purchases of frogs and switches have been made by this road and by the Chesapeake & Ohio. A large tonnage of train fastenings for the two roads is still pending.

Pig Iron

Shipments this month have started at about the same rate as during August, and little, if any, gain is expected in October, although an improvement is reported in operations by some makers of heating boilers and radiators and warm air furnaces. Two or three motor car manufacturers are expected to take more iron this month than last because of starting production on new models. Sales were light during the week. Interest in first quarter iron is not being maintained after a few sales were made for that delivery. Westinghouse Electric

& Mfg. Co. is inquiring for iron for its Cleveland plant for last quarter.

While Lake furnace prices are unchanged at \$16.50 to \$17 for foundry and malleable grades, the market lacks firmness and the lower price is being shaded for some of the competitive points. For Cleveland delivery, the price is holding at \$17.50, furnace. No deviation from \$18, furnace, is reported in the Michigan territory.

Prices per gross ton at Cleveland:
N'th'n fdy., sil. 1.75 to 2.25. \$17.50
S'th'n fdy., sil. 1.75 to 2.25. \$17.51 to 18.01
Malleable 17.50
Ohio silvery, 8 per cent.... 25.00
Stand. low phos., Valley... 27.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 50c. average local switching charge; \$3 from Jackson, Ohio; \$6.01 from Birmingham.

Bars, Plates and Shapes

Structural shapes are moving better than bars and plates. Demand for bars is largely outside of the automotive industry. Structural awards include 6100 tons for the Ohio State office building and an office building in Dayton. Locally, the structural field is stagnant. Bars are quoted at 1.60c., Cleveland, for outside shipment and at 1.65c. for local delivery. Plates and shapes are steady at 1.60c., Pittsburgh. Many consumers have contracted for the last quarter at these prices.

Reinforcing Bars

Contract for the Youngstown filtration plant, requiring 1100 tons of reinforcing steel, has been placed with the Clemmer-Noah Construction Co., Akron. The Western Hills viaduct, Cincinnati, will require a sizable tonnage.

Sheets

Demand appears to show a very slight gain from week to week and some consumers are showing more interest in contracts. The Fisher Body Corp. the past week placed approximately 2000 tons for November shipment to its Cleveland plant for Chevrolet bodies. While most mills are holding in this territory to 2.45c., Pittsburgh, for black sheets, the 2.35c. price has not entirely disappeared, as concessions to that price are being made for pickled grades or better, carrying extras. Auto body sheets are steady at 3.50c., with one or two mills asking 3.60c. Blue annealed sheets are fairly stable at 2.15c. and light plates at 2c. Continuous mills appear to be restricting their spread to \$2 a ton below these prices. Galvanized sheets range from 3 to 3.10c. On metal furniture sheets, 3.60c. is fairly common. Some of the mills are now selling their auto body seconds direct to consumers instead of to dealers. These are bringing \$40 a ton for Nos. 19 and 20 gage and \$45 for No. 22 gage.

Wire Products

Nails which recently sagged to \$1.90 a keg in some parts of this territory appear to have firmed up to \$2. Demand for wire products continues slow.

Strip Steel

Demand for hot-rolled strip is spotty and on the whole shows little, if any, improvement. Narrow strip, which goes largely to industries outside of the automotive field, is moving better than wide material. The market has become quite definitely established at 1.60c. for wide strip and 1.70c. for narrow, at which some of the mills have taken fourth quarter contracts. These prices were named recently on the round lots, but some effort was made to secure a \$1 a ton advance for the fourth quarter. Small lots are bringing 1.65c. for wide and 1.75c. for narrow. While cold-rolled strip ranges from 2.35c. to 2.45c., Cleveland, the higher price applies only to very small lots. Fender stock is quoted at 3.60c., although there are reports that this is being shaded.

Old Material

The market has a weaker tone on steel-making grades. Quotations on heavy melting steel have been reduced 25c. a ton. No. 1 grade is plentiful at \$12. No. 1 busheling has declined 50c. a ton. While quotations on other grades are unchanged, dealers are able to buy small lots for prompt shipment at concessions. One local mill is taking both steel-making and blast furnace scrap in limited quantities. Shipments to mills in the Valley district are sharply restricted. Heavy melting steel is quoted at \$14 to \$14.25 for Youngstown district delivery.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel...	\$11.50 to \$12.00
No. 2 heavy melting steel...	11.00 to 11.50
Compressed sheet steel...	11.50 to 12.00
Light bundled sheet	
stampings	9.00 to 9.25
Drop forge flashings.....	10.00 to 10.50
Machine shop turnings....	7.00 to 7.50
Short shoveling turnings..	8.00 to 8.50
No. 1 railroad wrought...	13.00 to 13.50
No. 2 railroad wrought...	14.00 to 14.50
No. 1 busheling.....	11.00 to 11.50
Pipes and flues.....	9.00 to 9.50
Steel axle turnings.....	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., billet bloom	
and slab crops.....	17.50 to 18.00
Blast Furnace Grades:	
Cast iron borings	8.00 to 8.50
Mixed borings and short	
turnings	8.00 to 8.50
No. 2 busheling	7.50 to 8.00
Cupola Grades:	
No. 1 cast	13.00 to 13.50
Railroad grate bars.....	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.....	18.50 to 19.50
Miscellaneous:	
Rails for rolling.....	16.25 to 16.50
Railroad malleable	15.00 to 15.50

NEW YORK

Fresh Weakness in Bar and Sheet Prices— Pig Iron Sales 9000 Tons

NEW YORK, Oct. 7.—Pig iron sales, at 9000 tons, compare with 12,000 tons in the previous week. The largest transaction was the purchase of 3000 tons by the Thatcher Co., Newark, N. J. It is understood that one-third of the total was placed with an Alabama furnace and the remainder with Northern furnaces. A fair amount of inquiry is coming from scattered sources and it is noteworthy that malleable foundries have been buying rather liberally. However, shipments to foundries have not shown material change, indicating that recent contracting was to a large extent speculative, reflecting the belief of melters that prices are close to the bottom. Prices are highly competitive, but no fresh breaks are reported.

The Worthington Pump & Machinery Corp. has placed 250 tons for its Buffalo plant and is in the market for 250 tons additional for that point, as well as for 550 tons for Harrison, N. J., and 150 tons for Holyoke, Mass.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	\$20.41 to \$20.91
*Buff. No. 2, del'd east.	
N. J.	18.78 to 19.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	18.89 to 19.39
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	18.89 to 19.89

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Warehouse Business

Jobbers report a fair volume of business, made up of unusually small orders. Structural steel purchases from stock are fairly numerous, but smaller in tonnage than usual at this season. Prices of black, galvanized and blue annealed sheets continue to be subject to concessions, even on small lots, and in some cases the quotations are shaded \$2 to \$3 a ton.

Cast Iron Pipe

Buying of pressure pipe is smaller than at any time this year, but the price shows no tendency to decline, continuing at \$36 to \$37 a net ton, f.o.b. Northern foundry. Public utilities are about the only buyers at present and their purchases are limited to orders for less than a carload, to complete existing contracts before freezing weather. Operating rates of certain Northern producers of pipe, which have been at 65 to 70 per cent of capacity, are off slightly as the backlogs of orders are reduced.

Finished Steel

Recent efforts to stiffen prices of steel bars and sheets have not proved successful, and quotations are back where they were a few weeks ago. While some bar mills were holding

out for a minimum of 1.65c., Pittsburgh, for the fourth quarter, one or two mills went out with a 1.60c. price and booked a good deal of business. As a result, all makers seem to have abandoned their efforts to obtain 1.65c., except on small lots, and the market is again quotable at 1.60c. to 1.65c. On black sheets, 2.35c., Pittsburgh, is quoted to the largest consumers, with 2.40c. available to most other buyers. The 2.45c. price is still being quoted by some mills, but scarcely anything but small lots are being booked at that level. Anything above 3c., Pittsburgh, on galvanized sheets seems to have disappeared. On blue annealed sheets, the former prices of 1.90c. for No. 10 gage and 2.05c. for No. 13 gage are in evidence, though some mills are trying to obtain higher levels on widths and gages not rolled by continuous mills. The low quotations, however, are not confined to makers of continuous sheets. Plates and structural shapes appear to be holding fairly well at 1.70c., Coatesville, for the former and 1.70c., Bethlehem, for the latter. Hot-rolled strip steel has generally declined to 1.60c., Pittsburgh, for the wide sizes and to 1.70c. for narrow widths. Cold-rolled strip steel is available to nearly all buyers at 2.35c., Pittsburgh or Cleveland.

Business improvement is reported by some sales offices, but the change

is noticeable more in the fact that individual orders are larger. Aggregate bookings have not increased very much.

Reinforcing Bars

Public work continues to feature business in concrete bars. The largest letting of the week was 500 tons for New Jersey highway improvements, while new pending projects include 1000 tons or more for a penitentiary at Riker's Island, New York. Revised bids on two large subway sections will be taken next week. For mill shipment, distributors of reinforcing bars are quoting 1.70c. a lb., Pittsburgh, on building and paving work, and 1.80c. on subway work (rail steel offered at \$4 a ton less); for delivery from local stock, 2.35c. a lb., New York, up to 3.05c. a lb. for lots of less than two tons.

Coke

Weather has not yet been severe enough to bring out much demand for heating coke. Foundry coke specifications show no gain. Furnace coke prices continue to range from \$2.50 to \$2.60 a net ton, Connellsville, while foundry coke quotations are unchanged.

Old Material

Brokers are encountering no decrease in the supply of scrap at the present level of the market and are apparently willing to consider new contracts with consumers at less than recent prices. No. 1 heavy melting steel is being bought at \$12.50 a ton, delivered to a consumer at Coatesville, Pa., and a few carloads are being bought at the same price for delivery at Claymont, Del., to complete old contracts at higher prices, shipments on which have been suspended for some months. Deliveries of No. 1 steel to Buffalo users by barge is continuing, with brokers paying \$10 to \$10.25 a ton, on barge, New York.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel..	\$9.00 to \$10.25
Heavy melting steel (yard)	5.75 to 6.25
No. 1 hvy. breakable cast..	8.00 to 9.00
Stove plate (steel works)..	6.00 to 6.25
Locomotive grate bars....	6.00 to 6.50
Machine shop turnings....	5.00 to 5.25
Short shoveling turnings..	5.00 to 5.50
Cast borings (blast fur. or steel works)	4.50 to 4.75
Mixed borings and turnings	4.50 to 5.00
Steel car axles.....	17.00
Iron car axles.....	19.00 to 19.50
Iron and steel pipe (1 in. dia., not under 2 ft. long)	7.50 to 8.00
Forge fire	7.00 to 7.50
No. 1 railroad wrought....	9.75
No. 1 yard wrought, long..	8.75
Rails for rolling.....	9.50 to 10.00
Stove plate (foundry)....	7.00
Malleable cast (railroad)..	10.50 to 11.00
Cast borings (chemical)....	8.50 to 9.00

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	\$14.00
No. 1 hvy. cast (columns, bldg. materials, etc.); cupola size.....	12.00
No. 2 cast (radiators, cast boilers, etc.)	11.50

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.10c.
Soft steel bars, small shapes.....	3.10c.
Iron bars	3.24c.
Iron bars, Swed. charcoal... 7.00c. to 7.25c.	
Cold-fin. shafting and screw stock—	
Rounds and hexagons.....	3.40c.
Flats and squares.....	3.90c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	3.75c.
Bands	3.40c.
Blue ann'l'd sheets (No. 10) 3.25c. to 3.40c.	
Black sheets (No. 24*).... 3.65c. to 3.90c.	
Galvanized sheets (No. 24*).... 4.25c.	
Long terme sheets (No. 24)..... 5.80c.	
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galv. annealed.....	5.15c.
Tire steel, ½ x ½ in. and larger... 3.40c.	
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases, 4.50c. to 7.00c.	

*No 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller.....	.65
1 x 30 in. and smaller.....	.65
Carriage bolts, cut thread:	
¾ x 6 in. and smaller.....	.65
¾ x 20 in. and smaller.....	.65
Boiler Tubes:	Per 100 Ft.
Lap welded, 2-in.....	\$19.00
Seamless steel, 2-in.....	20.25
Charcoal iron, 2-in.....	26.25
Charcoal iron, 4-in.....	67.00

PHILADELPHIA Steel Buying Small—Prices Fail to Hold

PHILADELPHIA, Oct. 7.—The volume of orders being booked by steel mills in this district has not improved, and rolling mill operations are barely maintained at about 50 per cent of capacity. While plate and shape quotations on new business are being held with only occasional concessions, black and galvanized sheet prices are receding to the levels which prevailed prior to the recent effort at stabilization of the market. Meanwhile, operations among consumers of both steel and pig iron are being maintained at a slightly better level than during the summer. Of the three leading radio manufacturers, one has stepped up production to about 6000 sets a day, another is unchanged at about 5000 sets a day, and the third has temporarily reduced output to below 3500 tons a day.

Pig Iron

Competition for tonnage with Southern furnaces has brought the eastern Pennsylvania quotation for foundry iron to a range of \$18 to \$18.50 a ton, furnace. Consumers are in many cases showing greater activity, but buying is generally only to cover immediate requirements, although interest continues in tonnage for first quarter delivery. Some substantial tonnages of pig iron are pending in this market, including 2000 tons of floor and cylinder iron for the Baldwin Locomotive Works, Eddystone, Pa., and 2000 tons of basic and 2000 tons of low phosphorus iron for the Standard Steel Works Co., Burnham, Pa. The latter company is accepting foreign as well as domestic bids on low phosphorus iron. Birmingham foundry iron continues at \$11.50, furnace, or \$16.75 a ton, on cars, Philadelphia.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil	\$18.76 to \$19.26
East. Pa. No. 2X, 2.25 to 2.75 sil	19.26 to 19.76
East. Pa. No. 1X	19.76 to 20.26
Basic (del'd east. Pa.)	17.75 to 18.25
Malleable	21.25
Stand. low phos. (f.o.b. east. Pa. furnace)	24.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil	22.29
Va. No. 2X, 2.25 to 2.75 sil	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Steel Bars

The market is quotable at 1.60c. to 1.65c. a lb., Pittsburgh, or 1.89c. to 1.94c., delivered Philadelphia, the lower price appearing on desirable business. Reinforcing bars are quiet, most current projects requiring only small tonnages. Billet steel bars are quoted at 1.75c. to 1.85c. a lb., Pittsburgh, or 2.04c. to 2.14c., delivered Philadelphia. Rail steel bars are 1.55c. to 1.65c., Franklin, Pa., or 1.84c.

to 1.94c., delivered Philadelphia, with no extra for cutting to length or bending.

Shapes

Mill operations are unchanged, but the tonnage of new business is small, as many consumers covered for their nearby requirements at the former price level. The quotation on new business is generally 1.70c. a lb., f.o.b., nearest mill to consumer, or 1.76c., delivered Philadelphia, with occasional concessions on large contracts. Fabricators are bidding on some fair projects, including 2500 tons for a bridge over the Baltimore & Ohio Railroad tracks at Pennsylvania Avenue, Philadelphia.

Plates

On most of the new business, 1.70c. a lb., Coatesville, Pa., or 1.80½c., delivered Philadelphia, is quoted, but there are still outstanding quotations at lower prices. Business being placed on mill books is small, and in some cases mills are maintaining a 50 per cent operation in their rolling departments with difficulty.

Sheets

Although there has been no recession in the operating rates of consumers, since the slight improvement in activity toward the end of August, sheet buying is limited to small lots. Black sheet quotations lack firmness at 2.45c. a lb., Pittsburgh, or 2.74c., Philadelphia, and desirable orders usually bring concessions to 2.40c., Pittsburgh, or 2.69c., Philadelphia, with 2.35c., Pittsburgh, often used as a base price for full-finished sheets. Galvanized sheets have generally settled to 3c., Pittsburgh, or 3.29c., delivered Philadelphia. Except when in competition with the product of the continuous mill, blue annealed sheets, No. 13 gage, are being maintained at 2.15c., Pittsburgh, or 2.44c., delivered Philadelphia. Blue annealed plates, No. 10 gage, are quoted at 2c., Pittsburgh, or 2.29c., Philadelphia. The

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.60c.
Structural shapes	2.60c.
Soft steel bars, small shapes, iron bars (except bands)	2.70c.
Reinforc. steel bars, sq., twisted and deform.	2.60c. to 2.70c.
Cold-fin. steel, rounds and hex.	3.40c.
Cold-fin. steel, sq. and flats	3.90c.
Steel hoops	3.25c.
Steel bands, No. 12 to ¼-in. incl.	3.00c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.70c.
†Galvanized sheets (No. 24)	4.25c.
Light plates, blue annealed (No. 10)	3.15c.
Blue ann'l'd sheets (No. 13)	3.30c.
Diam. pat. floor plates, ¼-in.	5.30c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

plate producer at Claymont, Del., on Monday rolled the first sheets on the new blue annealed mill recently installed.

Imports

In the week ended Oct. 4, 1229 tons of chrome ore arrived at this port, of which 720 tons was from Greece and 509 tons from British South Africa. Iron ore imports consisted of 6700 tons from Algeria, and there was 500 tons of manganese ore from the Dutch East Indies. Only 50 tons of pig iron was received, all from the Netherlands, and 50 tons of spiegeleisen arrived from the United Kingdom. Steel imports were 402 tons of structural shapes and 27 tons of hoop steel from Belgium.

Old Material

All grades of scrap are quiet and prices lack strength, although there have been no transactions of consequence to test the market. Recent purchases of old hydraulic bundles by a Pencoyd, Pa., consumer make the market on this grade quotable at \$9 to \$9.50 a ton, delivered. Other grades are unchanged.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$13.00
No. 2 heavy melting steel	\$10.50 to 11.00
Heavy melting steel (yard)	10.00
No. 1 railroad wrought	14.75 to 15.00
Bundled sheets (for steel works)	9.50
Hydraulic compressed, new	11.00 to 11.50
Hydraulic compressed, old	9.00 to 9.50
Machine shop turnings (for steel works)	9.00
Heavy axle turnings (or equiv.)	11.50 to 12.00
Cast borings (for steel works and roll. mill)	8.50 to 8.75
Heavy breakable cast (for steel works)	11.50 to 12.00
Railroad grate bars	10.00
Stove plate (for steel works)	10.00
No. 1 low phos., hvy., 0.04% and under	20.00
Couplers and knuckles	17.50 to 18.00
Rolled steel wheels	17.50 to 18.00
No. 1 blast f'nace scrap	8.00 to 8.50
Wrot. iron and soft steel pipes and tubes (new specific.)	12.00 to 12.50
Shafting	18.00 to 18.50
Steel axles	20.50 to 21.00
No. 1 forge fire	11.00 to 11.50
Cast iron carwheels	15.00
No. 1 cast	13.00 to 13.50
Cast borings (for chem. plant)	14.00 to 14.50
Steel rails for rolling	13.50 to 14.00

Paige & Jones Chemical Co., Hammond, Ind., has sold to the Permutit Co., 440 Fourth Avenue, New York, the Zeolite and lime soda water softening and filter departments of its business, including machinery, inventories, patterns and drawings. It has been manufacturing Zeolite water softening apparatus as licensee under the Permutit Co.'s patents. The Permutit company will furnish repair parts and replacements for Paige-Jones mechanical equipment now in use. Paige & Jones Chemical Co. will continue the chemical branch of its business.

BIRMINGHAM Only Seven of 23 Open-Hearths In Alabama Active

BIRMINGHAM, Oct. 7.—The turn of the new quarter finds the market still on a spot basis, and the customary forward contracting is almost entirely absent. A slight improvement in specification is noted from certain melters who suspended shipments in late September. Shipments of the merchant producers last month were close to production, and the net gain in furnace stocks during the third quarter was light. Current sales for iron to be delivered in the district carry a \$14 base, which is the same price that was in effect last quarter.

The total of active furnaces was increased from 10 to 11 on Oct. 1 when the Tennessee company placed in operation its Fairfield No. 5 furnace, which had been banked since Aug. 16. Today the No. 6 Fairfield furnace is to be banked, bringing the total of active furnaces back to 10 again. The Woodward Iron Co. has changed its Woodward No. 2 furnace from foundry to basic iron. After the above mentioned change today there will be eight furnaces on foundry iron and two on basic iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.....	\$14.00
No. 1 fdy., 2.25 to 2.75 sil.....	14.50
Basic	14.00

Finished Steel

Demand for wire products, bars and structural shapes is generally stronger than 30 days ago, but improvement is slow. Order books are lighter than they have been at this time in several years. Plates are in fair demand for tank and miscellaneous fabrication purposes, but only a small movement is being made to car building plants. Sheet demand is considered to be nearer normal than is demand for other lines. All quotations are at the lowest figures reached this year.

The Tennessee company is operating four open-hearths at Fairfield, a reduction of one. All open-hearths at Ensley remain idle. At Alabama City the Gulf States Steel Co. continues to work three of six. This makes a total of seven active open-hearths of 23.

The Nashville Bridge Co. has booked 3245 tons of structural steel for highway bridges in Kentucky, and the Virginia Bridge & Iron Co. will furnish 2000 tons for the same purpose. Aside from these awards, there has been little buying. Feelers have been issued on some good projects that have been held up for some time. Reinforcing bar manufacturers report improved demand for road and bridge construction work, but no change in the light demand from other sources.

Cast Iron Pipe

Demand is off as compared with the average of the past few weeks. The new tonnage up for figures is the lightest in several weeks. Of 3000 tons awarded by Los Angeles, the American Cast Iron Pipe Co. booked

1300 tons; United States Pipe & Foundry Co., 700 tons, and National Cast Iron Pipe Co., 600 tons. Another new order of the American Cast Iron Pipe Co. calls for 300 tons for Clarks-ville, Tenn. District plants have bids in on important tonnages pending at Oakland, Cal., and Long Beach, Cal. The outstanding project in the Southern territory is upward of 1500 tons to be awarded by Marrero, La., on Oct. 30. As a result of the decrease in demand, two companies have made some reduction in output. All producers are keeping yard stocks low and endeavoring to confine them to as near standard sizes as possible. Quotations are unchanged from \$37 to \$38, base Birmingham.

Coke

Demand for foundry coke is off, and shipments are declining from the light average of last month. This is in

striking contrast to an upturn that is usually characteristic of this season. The price remains at \$5, base, which has been in effect for two and a half years.

Old Material

The market is extremely sluggish for both steel and cast iron scrap. However, some grades of the latter are beginning to receive a little more attention. Recent weakness in stove plate has brought a reduction of 50c. a ton in quotations. Other quotations are without change, though in some steel lines they represent nominal values due to the very light demand.

Prices per gross ton deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$12.00
Scrap steel rails.....	\$12.50 to 13.00
Short shoveling turnings..	9.00
Cast iron borings.....	9.00
Stove plate	10.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought... 10.00 to	10.50
Rails for rolling.....	13.50
No. 1 cast.....	11.50
Tramcar wheels	11.50
Cast iron borings, chem....	13.50
Cast iron carwheels.....	12.00

YOUNGSTOWN No Appreciable Increase in Recent Bookings of Valley Steel Mills

YOUNGSTOWN, Oct. 6.—Valley steel mills have not had an appreciable increase in tonnage releases in the last two weeks, and business is holding fairly well at levels established during September, which are slightly higher than the July-August average. While automotive demand, which takes a large part of the output of Youngstown district producers, is so restricted there is little opportunity for a substantial improvement in operations. Consumers in the immediate Valley territory have been specifying more freely than they did during the summer, but their schedules are still reduced and are not expected to pick up much this quarter.

Steel mill operations are holding at about the level which has prevailed for several weeks, with approximately half of the available open-hearth capacity in the district occupied. Pig iron production has seen further curtailment, and finishing mill schedules continue rather spotty, with a 50 per cent operation considered rather good. This is not true in the case of pipe mills, which are averaging somewhat better, although butt-weld and lap-weld units are not well engaged. The new electric-weld mills of the Republic company are occupied at capacity, and the Youngstown Sheet & Tube Co. is beginning commercial production on its new electric-weld mill for large size pipe. Pipe production has maintained a strong demand for skelp, and the plate capacity of the district is running at a better rate than any of the other finishing departments.

A number of companies are operating sheet mills at a fair schedule one week and closing them down entirely the following week. The same is true to a lesser extent of strip steel, and as

a result it is difficult to estimate the average operating rate in these departments. It is not above 45 per cent on sheets and somewhat lower on strips. Tin plate production was well maintained during September, but is expected to decline this month. Demand for bars has been very dull and production has been well under 50 per cent for several weeks.

Forward buying for the fourth quarter enabled mills to take a firmer price stand, but the efforts to boost quotations on sheets, strip and bars have not been entirely successful. In many cases larger consumers have been able to contract for the remainder of the year at old prices, and spot tonnage in the way of small orders has been about the only opportunity offered mills to secure the prices they desire. Black sheets which are quoted by the larger mills at 2.45c., Pittsburgh, have been shaded \$2 a ton rather freely by some makers, and a 3c. price on galvanized sheets has been made on numerous occasions to the trade as well as to large jobbers. Blue annealed sheets and light plates are holding somewhat better at 2.15c. and 2c., Pittsburgh, but here again tonnage has been booked at concessions. Hot-rolled strip is more freely available at 1.60c. and 1.70c., a decline of \$1 a ton from recent asking prices, while the 2.35c., Pittsburgh, prices on cold-rolled material is the only figure sought in most cases. Some mills still attempt to get 2.45c. on small lots. Bars, which have been quotable at 1.60c. to 1.65c., are now better established at the higher figure, but there is very little demand and some prospective buyers who hoped to get the lower price have withdrawn from

the market without making purchases. Plates are fairly well held at 1.60c., Pittsburgh.

The pig iron market is still rather unsettled in spite of recent price declines, and no heavy buying has been done in this district. Basic iron is quotable at \$17, Valley furnace, foundry at \$17.50, and malleable and Bessemer at \$18. These figures are somewhat out of line with the usual dif-

ferentials applying in the pig iron market, and downward adjustments in prices seem likely in the near future. One Valley consumer purchased a small tonnage of No. 1 heavy melting steel recently at \$15, and that market is quotable at \$14.75 to \$15.25. Mills are not interested in future buying, as most of them are covered for some time to come at the present rate of operations.

CANADA Business Showing Some Gains—Scrap Prices Reduced

TORONTO, Oct. 7.—In some respects the iron and steel industry of Canada is showing improvement. According to one of the steel companies, sales for the week just past were the best experienced in several months. The new business was of a diversified character and in small lots. Inquiries are appearing that indicate additional steady buying. The improvement in demand has not been generally reflected in increased mill production, although there are prospects that some mills will soon obtain large contracts from the Canadian National and Canadian Pacific railways.

The Government has announced an extensive program that will involve heavy expenditure for rails, track supplies and other lines of iron and steel products. The Algoma Steel Corp., Sault Ste. Marie, Ont., has recently closed a large rail order and will start up its rail mill before the middle of the month.

Iron ore shipments from Belle Island, through subsidiaries of the Dominion Steel & Coal Co., Ltd., increased in volume during the first two weeks of September. Shipments for the two weeks totaled about 100,000 tons, bringing shipments for the year to date to 923,380 tons. Of the exports to the middle of September, 477,191 tons went to Germany; 416,533 tons to the company's works at Sydney, N. S., and 29,656 tons to the United States. While shipments to Germany and Sydney compare favorably with those of last year, exports to the United States have been considerably reduced.

Structural Steel

The demand for structural steel shows indications of early recovery on an expansive scale. A number of contracts are pending which will supply business to several plants for some time to come. It is understood that the Quebec Government will soon announce a program of bridge construction which will represent an expenditure of about \$4,000,000. The Caughnawaga bridge project, not included in the above estimate, will take between 3000 and 5000 tons.

The Hamilton Bridge Co., Hamilton, Ont., has closed two contracts for steel, representing \$300,000 and \$250,000 respectively. In connection with the new refining unit at Copper Cliff, Ont., for the International Nickel Co.

of Canada, the Dominion Bridge Co. has closed a contract for 5000 tons of steel.

Pig Iron

While there was a slight flurry in forward delivery business during the past week, total commitments for fourth quarter run considerably under those of a year ago. Spot buying is improving slowly. Local blast furnace representatives look for steady buying through the remainder of the year owing to the fact that most melters have no surplus stocks. Implement makers continue to take supplies from the United States, but otherwise imports are running at a minimum. Prices are unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.....	\$22.60
No. 2 fdy., sil. 1.75 to 2.25.....	22.10
Malleable	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.....	\$24.00
No. 2 fdy., sil. 1.75 to 2.25.....	23.50
Malleable	24.00
Basic	22.50

PACIFIC COAST

SAN FRANCISCO, Oct. 4.—(By Air Mail).—Some improvement in general business conditions on the Pacific Coast is noted, but new inquiries are slow in coming forth. Plate quotations are off about \$2 a ton on large purchases. Important bookings included 1800 tons of structural steel for the State Building, Los Angeles, secured by the Consolidated Steel Corp., and 2216 tons of cast iron pipe for Long Beach, Cal., awarded to the United States Pipe & Foundry Co.

Bars

The Pacific Coast Steel Corp. took 2800 tons of reinforcing bars for a power house and dam at Rock Island,

Warehouse Prices, f.o.b. San Francisco

Base per Lb.	
Plates and struc. shapes.....	3.40c.
Soft steel bars.....	3.40c.
Black sheets (No. 24).....	4.35c.
Blue ann'l'd sheets (No. 10).....	3.80c.
Galv. sheets (No. 24).....	5.00c.
Struc. rivets, 1/2-in. and larger.....	5.00c.
Com. wire nails, base per keg.....	\$3.35
Cement c'd nails, 100 lb. keg.....	3.35

Old Material

The demand for steel scrap has fallen to a state bordering on stagnation, while iron grades have shown improvement. Mills are taking in small quantities of No. 1 heavy melting steel, but, according to local dealers, are out of the market entirely for turnings. Owing to restricted demand for old materials, dealers have made a general downward revision in buying prices. The cuts range from \$2 to \$5 a ton, with the largest reductions on turnings. Steel and wrought iron axles were cut \$3 and \$5 a ton respectively in the Toronto market, with dealers pointing out that there is no market at present. Heavy melting steel dropped from \$9 to \$7 a gross ton and other grades show corresponding reductions.

Dealers' buying prices for old material:

Per Gross Ton	
	Toronto Montreal
Heavy melting steel.....	\$7.00 \$6.00
Rails, scrap	7.00 6.00
No. 1 wrought.....	6.00 8.00
Machine shop turnings...	2.00 2.00
Boiler plate	5.00 4.50
Heavy axle turnings.....	2.50 2.50
Cast borings	2.00 2.00
Steel borings	2.00 2.00
Wrought pipe	2.00 2.00
Steel axles	7.00 9.00
Axles, wrought iron.....	7.00 11.00
No. 1 machinery cast.....	10.00
Stove plate	8.00
Standard carwheels	8.50
Malleable	8.00
Per Net Ton	
No. 1 mach'ry cast.....	11.00
Stove plate	9.00
Standard carwheels	10.00
Malleable scrap	9.00

Plate Prices Weaken—Some Gain in General Business

Pig iron prices per gross ton at San Francisco:

*Utah basic	\$22.00 to \$24.00
*Utah fdy., sil. 2.75 to 3.25	22.00 to 24.00
**Indian fdy., sil. 2.75 to 3.25	22.00 to 24.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Wash., and the Soule Steel Co. secured 172 tons for two storm drains in Los Angeles. Other awards included 134 tons for two bridges in Oakland. No new inquiries of size came up for figures during the week. Out-of-stock quotations in the Los Angeles and San Francisco districts continue firm and unchanged at 2.50c., base, on car-load lots. Demand for merchant bar steel remains light. On this class of material 2.35c., c.i.f., is being quoted generally.

Plates

The R. E. Hazard Contracting Co. secured the general contract for a 260-ton, 55,000-bbl. tank for the Naval Operating Base in San Diego. The

Hollow Metal Door Trim Co. secured the contract for hollow metal work in the General Hospital, Los Angeles, calling for 2000 tons of plates and sheets. Plate prices are now general at 2.15c., c.i.f., on the usual run of the market, while large tonnages for pipe line and tank projects are quoted at 2.05c.

Structural Shapes

Structural awards exceeded 2300 tons. The McClintic-Marshall Co. booked 100 tons for an apartment and three ward buildings in San Francisco. The Wallace Bridge & Structural Steel Co. took 300 tons for a bridge in Washington and the Golden Gate Iron Works secured 216 tons for a theater on Ocean Avenue, San Francisco. The

Atlantic Avenue bridge in Los Angeles, which originally called for 560 tons of structural, was awarded on a reinforced concrete basis. Bids for 3500 tons for the Mills Building, San Francisco, will be opened next week. Plain material ranges from 2.15c. to 2.25c., c.i.f.

Cast Iron Pipe

In addition to the 2216 tons for Long Beach, mentioned above, approximately 300 tons of various sizes for a pipe line at Anacortes, Wash., was placed with an unnamed interest. No award has yet been made on 2022 tons for Oakland or on 3008 tons for Los Angeles. Fullerton, Cal., will open bids Oct. 7 on 331 tons of 6 to 12-in. Class 150 pipe.

ST. LOUIS Pig Iron Consumers Buying Cautiously—Steel Trade Is Quieter

ST. LOUIS, Oct. 7.—The opening of the fourth quarter passed without any buying movement by melters, and none is expected for several weeks. There undoubtedly has been some carryover from the preceding quarter because of the small demand for finished products, and the extent of the buying will depend upon the order files of melters, who have been proceeding cautiously with their commitments for raw materials. Prices are firm, and makers believe that consumers realize that present quotations will continue. Shipments of the St. Louis Gas & Coke Corp. for September were in excess of those for August. Sales for the week were light. There are two inquiries before the market for Southern iron totaling about 1500 tons.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill...	\$17.50
Malleable, f.o.b. Granite City	17.50
N'th'n No. 2 fdy., deliv'd St. Louis	19.66
Southern No. 2 fdy., deliv'd	\$15.92 to 16.42
Northern malleable, deliv'd	19.16 to 19.66
Northern basic, deliv'd....	19.16 to 19.66

Freight rates: 75c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-fin. rounds, shafting, screw stock	3.60c.
Black sheets (No. 24).....	4.25c.
Galv. sheets (No. 24).....	4.85c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Galv. corrug. sheets (No. 24).....	4.30c.
Galv. corrug. sheets.....	4.90c.
Structural rivets.....	4.15c.
Boiler rivets	4.15c.
Per Cent Off List	
Tank rivets, 1/4-in. and smaller, 100 lb. or more	65
Less than 100 lb.....	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50

Finished Steel

The improvement in demand for plates, shapes, bars and sheets which manifested itself during the early weeks of September was not sustained, and trade is quieter. Prices are being well maintained, however. September warehouse business, which was confined almost entirely to industrial lines, was about equal to that of August. The demand was better during the first weeks of last month, but fell off toward the latter part. Interest in reinforcing bars is centered in the Merchandise Mart project, which will require approximately 2000 tons. The structural steel lettings during the week were small.

BOSTON Pig Iron Prices Soft—Scrap Market Trend Downward

BOSTON, Oct. 7.—Pig iron sales totaled about 5000 tons the past week, including 1000 tons of No. 2X and No. 1X to a Connecticut foundry and 600 tons of malleable to the Rhode Island Malleable Iron Co. against its 1000-ton inquiry. Buffalo district furnaces took about 1200 tons, and those east of Buffalo close to 3900 tons. In the past two weeks the Mystic Iron Works has sold about 6000 tons. Current bookings call for deliveries ranging from this month into the first quarter of 1931. It is not known here if the Eastern Malleable Iron Co., Naugatuck, Conn., has covered on its 2500-ton inquiry.

Prices continue weak. Some Buffalo stacks, which have been asking \$16 a ton, furnace, for No. 2 plain and No. 2X and \$16.50 for No. 1X have reduced prices 50c. a ton. Furnaces east of Buffalo are shading the Buffalo iron delivered prices. There are no important tonnages under negotiation. The New England foundry melt is running a little heavier

Old Material

The old material market is weaker, and prices on some items are lower as a result of a lack of interest by consumers, heavy offerings by the railroads and the desire of country dealers to unload their holdings. Dealers here had expected business to develop at the turn of the quarter, but it has failed to materialize. Dealers are said to be covered on sales made recently. St. Louis-San Francisco, which issued a list of 150 carloads of old material last week, issued another list with 112 carloads. Other lists follow: Baltimore & Ohio, 8865 tons; Nashville, Chattanooga & St. Louis, nine carloads; and Mobile & Ohio, eight carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

Selected heavy melting steel	\$11.50 to \$12.00
No. 1 heavy melting or shoveling steel.....	11.00 to 11.50
No. 2 heavy melting or shoveling steel.....	10.00 to 10.25
No. 1 locomotive tires....	12.50 to 13.00
Misc. stand-sec. rails including frogs, switches and guards, cut apart....	12.50 to 13.00
Railroad springs.....	14.00 to 14.50
Bundled sheets	7.00 to 7.50
No. 2 railroad wrought....	11.00 to 11.50
No. 1 busheling.....	8.00 to 8.50
Cast iron borings and shoveling turnings	6.00 to 6.50
Iron rails	10.00 to 11.00
Rails for rolling.....	13.00 to 13.50
Machine shop turnings....	4.50 to 5.00
Heavy turnings	9.00 to 9.50
Steel car axles.....	16.50 to 17.00
Iron car axles.....	21.00 to 21.50
Wrot. iron bars and trans.	14.00 to 14.50
No. 1 railroad wrought....	9.00 to 9.50
Steel rails, less than 3 ft....	14.50 to 15.00
Steel angle bars.....	12.00 to 12.50
Cast iron carwheels.....	11.50 to 12.00
No. 1 machinery cast.....	10.50 to 11.00
Railroad malleable	11.50 to 12.00
No. 1 railroad cast.....	10.25 to 10.75
Stove plate	9.00 to 9.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00
Agricult. malleable	10.00 to 10.50

than a month ago, but the improvement is spotty.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25...	\$19.78 to \$20.28
†Buffalo, sil. 2.25 to 2.75...	19.78 to 20.28
*Buffalo, sil. 1.75 to 2.25...	20.41 to 20.91
*Buffalo, sil. 2.25 to 2.75...	20.91 to 21.41
Va., sil. 1.75 to 2.25.....	25.21
Va., sil. 2.25 to 2.75.....	25.71
*Ala., sil. 1.75 to 2.25.....	21.11
*Ala., sil. 2.25 to 2.75.....	21.61
†Ala., sil. 1.75 to 2.25.....	17.25
†Ala., sil. 2.25 to 2.75.....	17.75

Freight rates: \$4.91 all rail and \$4.28 rail and water from Buffalo; \$5.21 all rail from Virginia; \$9.61 all rail from Alabama and \$5.75 rail and water from Alabama to New England seaboard.

*All rail rate.
†Rail and water rate.

Fabricated Steel

It is expected that Massachusetts will soon award 1200 tons of steel for a Tyngsboro bridge and that the General Electric Co. within two or three weeks will call for bids on a transformer tank manufacturing plant calling for 1500 tons.

Cast Iron Pipe

Massachusetts has purchased 27 tons of 10-in. pipe, 85 tons of 8-in.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.365c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.015c. to 4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex.	3.50c. to 5.55c.
Squares and flats	4.00c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
Per Cent Off List	
Machine bolts	.60 and 5
Carriage bolts	.60 and 5
Lag screws	.60 and 5
Hot-pressed nuts	.60 and 5
Cold-punched nuts	.60 and 5
Stove bolts	.70 and 10

and 25 tons of 6-in. from R. D. Wood & Co. Hopkinton, Mass., has closed bids on 300 tons of 6-in. Portland, Me., is feeling out the market on 5000 tons of 24-in., but there is no assurance the pipe will be purchased this year. The market on 6-in. and larger pipe is generally \$36 a ton, on cars foundry.

Reinforcing Steel

Due to keen competition, billet steel prices are lower. From stock, 1 to 5-ton lots are now 3c. a lb., base, as against 3.15c.; 6 to 99-ton lots, 2.50c. to 2.55c., as against 2.65c.; and 100-ton lots and larger, 2.25c., as against 2.55c. Bookings the past week approximated 1200 tons, 850 tons of which is for a Harvard University laboratory at Cambridge. Three new jobs aggregating 425 tons are open

for bids, bringing the total outstanding business up to about 1800 tons.

Old Material

The failure of a large Pittsburgh district consumer to come into the market as expected and the continued lack of buying by other users, together with the withdrawal of the American Steel & Wire Co., Worcester, Mass., from the market, have created some confusion as to scrap values. It is certain that No. 1 heavy melting steel is 25c. a ton lower at \$8.50 to \$8.75 a ton, on cars shipping point. One sale at \$8.10 a ton is reported, but that low price probably was due to special reasons. For girder rails, \$7.25 a ton is the general price. T rail, long bundled skeleton, forge flashing and shafting values appear to be a matter of guesswork. Most recent sales of steel turnings have been at \$3.85, \$4 or \$4.10. Chemical borings are in demand and scarce. The Boston & Albany Railroad has closed bids on 1800 tons. The Maine Central Railroad, which recently offered 400 tons of No. 1 steel scrap and 1280 tons of rails, is reported to have rejected all bids.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	\$8.50 to \$8.75
Scrap T rails	8.50 to 8.60
Scrap girder rails	7.25 to 7.50
No. 1 railroad wrought	8.00 to 8.50
Machine shop turnings	3.85 to 4.25
Cast iron borings (steel works and rolling mill)	3.85 to 4.25
Bundled skeleton, long	6.00 to 7.00
Forge flashings	6.50 to 7.50
Blast furnace borings and turnings	3.10 to 3.50
Forge scrap	6.50 to 7.00
Shafting	13.00 to 14.00
Steel car axles	16.50 to 17.00
Wrought pipe, 1 in. in diameter (over 2 ft. long)	7.00 to 7.25
Rails for rolling	10.00 to 10.25
Cast iron borings, chemical	9.00 to 9.50
Prices per gross ton deliv'd consumers' yards:	
Textile cast	\$11.00 to \$11.50
No. 1 machinery cast	12.50 to 13.50
No. 2 machinery cast	10.50 to 11.50
Stove plate	8.00
Railroad malleable	14.00 to 14.50

order because of lack of demand. Some strengthening of cast iron borings is afforded by a sale for blast furnace use at around \$9, Buffalo. A sale of selected machine shop turnings at \$9 is reported to have been made at Niagara Falls. Michigan Central scrap came to Buffalo, with \$13 being paid for the No. 1 heavy melting steel.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	\$12.50 to \$13.00
No. 2 heavy melting scrap	11.00 to 11.50
Scrap rails	12.00 to 12.50
Hydraulic comp. sheets	11.00 to 11.50
Hand bundled sheets	9.00 to 9.50
Drop forge flashings	11.00 to 11.50
No. 1 busheling	11.00 to 12.00
Hvy. steel axle turnings	11.00 to 11.50
Machine shop turnings	6.00 to 7.00
No. 1 railroad wrought	10.00 to 10.50
Acid Open-Hearth Grades:	
Knuckles and couplers	15.00 to 15.50
Coll and leaf springs	15.00 to 15.50
Roller steel wheels	15.00 to 15.50
Low phos. billet and bloom ends	15.50 to 16.00
Electric Furnace Grades:	
Short shov. steel turnings	9.75 to 10.25
Blast Furnace Grades:	
Short mixed borings and turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
No. 2 busheling	7.00
Rolling Mill Grades:	
Steel car axles	15.00 to 15.50
Iron axles	19.00 to 19.50
Cupola Grades:	
No. 1 machinery cast	11.00 to 11.50
Stove plate	10.00 to 10.50
Locomotive grate bars	8.25 to 9.25
Steel rails, 3 ft. and under	15.00 to 15.50
Cast iron carwheels	13.50 to 14.00
Malleable Grades:	
Industrial	14.25 to 15.25
Railroad	14.25 to 15.25
Agricultural	14.25 to 15.25
Special Grades:	
Chemical borings	11.50 to 12.00

Cincinnati

Pig Iron Demand Continues Slight Uptrend—Sheet Sales Gain

CINCINNATI, Oct. 7.—The recent slight uptrend in demand for pig iron continues. Furnace representatives report total sales for the week of about 4140 tons. Except for 500 tons of Northern iron sold to an eastern Ohio consumer and 300 tons of Southern iron to an Indiana melter, the week's business consisted of spot orders for immediate needs. The melt continues at a low rate.

Prices per gross ton, deliv'd Cincinnati:	
So. Ohio fdy., sil. 1.75 to 2.25	\$20.89 to \$21.39
Ala. fdy., sil. 1.75 to 2.25	15.19 to 16.19
Ala. fdy., sil. 2.25 to 2.75	15.69 to 16.69
Tenn. fdy., sil. 1.75 to 2.25	15.19 to 16.19
S'th'n Ohio silvery, 8 per cent	24.39

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Steel

Further improvement in demand for sheets is reported. Orders indicate a diversified demand, but the radio industry accounted for a sizable portion of last week's increased business. The leading independent sheet interest states that its schedules have

(Concluded on page 1042)

BUFFALO Pig Iron Business in Moderate Volume—Scrap Market Dull

BUFFALO, Oct. 7.—Although there is a satisfactory movement of pig iron on contracts, only a small volume of new business is being placed. Bookings in this market in the past week were about 5000 tons. The Worthington Pump & Machinery Corp. is inquiring for 700 tons of foundry and 100 tons of Bessemer.

The General Electric Co. requires 300 tons of foundry for its Elmira plant. Most of the other inquiries are for smaller tonnages. Prices are unchanged.

Prices per gross ton, f.o.b. furnace:	
No. 2 fdy., sil. 1.75 to 2.25	\$18.50
No. 2X fdy., sil. 2.25 to 2.75	19.00
No. 1 fdy., sil. 2.75 to 3.25	20.00
Malleable, sil. up to 2.25	19.00
Basic	17.50
Lake Superior charcoal	27.28

Finished Steel

Mill operations in this territory continue about the same as a week ago. The Lackawanna plant of the Bethlehem Steel Co. is operating 13 open-hearths; the Donner plant, four; the Wickwire-Spencer Steel Corp. is down to two, and Gould Coupler Co. is operating one.

Old Material

The market is exceptionally quiet. A mark-down of several grades is in

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.25c.
Soft steel bars	3.15c.
Reinforcing bars	2.95c.
Cold-fin. flats and sq.	3.65c.
Rounds and hex.	3.15c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.60c.
Bands	3.50c.
Hoops	3.90c.
Blue ann'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	\$2.60
Black wire, base per 100 lb.	3.20

▲▲ Semi-Finished Steel, Raw Materials, Bolts and Rivets ▲▲

Mill Prices of Semi-Finished Steel

Billets and Blooms	
	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	\$31.00
Rerolling, 4-in. and under 10-in., Youngstown	31.00
Rerolling, 4-in. and under 10-in., Cleveland	31.00
Rerolling, 4-in. and under 10-in., Chicago	32.00
Forging quality, Pittsburgh	36.00

Sheet Bars	
(Open Hearth or Bessemer)	Per Gross Ton
Pittsburgh	\$31.00
Youngstown	31.00
Cleveland	31.00
Slabs	
(8 in. x 2 in. and under 10 in. x 10 in.)	Per Gross Ton
Pittsburgh	\$31.00
Youngstown	31.00
Cleveland	31.00

Skelp	
(F.o.b. Pittsburgh or Youngstown)	Per Lb.
Grooved	1.60c. to 1.70c.
Universal	1.60c. to 1.70c.
Sheared	1.60c. to 1.70c.
Wire Rods	
(Common soft, base)	Per Gross Ton
Pittsburgh	\$36.00
Cleveland	36.00
Chicago	37.00

Prices of Raw Material

Ores	
Lake Superior Ores, Delivered Lower Lake Ports	Per Gross Ton
Old range Bessemer, 51.50% iron	\$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40
Foreign Ore, c.i.f. Philadelphia or Baltimore	
Per Unit	
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	.8c. to 9c.
Iron ore, low phos., Swedish, average 68% iron	11c.
Iron ore, basic Swedish, average 65% iron	9c.
Manganese ore, washed 52% manganese, from the Caucasus	.26c. to .28c.
Manganese ore, Brazilian, African or Indian, basic 50%	.26c. to .28c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$.12.00 to \$.14.00
Per Gross Ton	
Chrome ore, 45 to 50% Cr ₂ O ₃ crude, c.i.f. Atlantic seaboard	\$.22.00 to \$.24.00
Per Lb.	
Molybdenum ore, 85% concentrates of MoS ₂ delivered	.50c. to .55c.

Coke	
Furnace, f.o.b. Connellsville	Per Net Ton
prompt	\$2.60 to \$2.65
Foundry, f.o.b. Connellsville	3.25 to 4.75
Foundry, by-products, Chgo ovens	8.00
Foundry, by-products, New England, del'd.	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal	
Mine run steam coal, f.o.b. W. Pa. mines	Per Net Ton
	\$1.25 to \$1.35
Mine run coking coal, f.o.b. W. Pa. mines	1.40 to 1.50
Gas coal, 3/4-in. f.o.b. Pa. mines	1.70 to 1.80
Mine run gas coal, f.o.b. Pa. mines	1.50 to 1.60
Steam slack, f.o.b. W. Pa. mines	.55 to .65
Gas slack, f.o.b. W. Pa. mines	.90 to 1.00

Ferromanganese	
	Per Gross Ton
Domestic, 80%, seaboard	\$.94.00 to \$.99.00
Foreign, 80%, Atlantic or Gulf port, duty paid	94.00 to 99.00

Spiegeleisen	
	Per Gross Ton Furnace
Domestic, 19 to 21%	\$.31.00 to \$.33.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon	
	Per Gross Ton Delivered
50%	\$83.50
75%	130.00
Per Gross Ton Furnace	
10%	\$.35.00
11%	37.00
12%	12 to 16%
13%	39.00

Bessemer Ferrosilicon	
F.o.b. Jackson County, Ohio, Furnace	Per Gross Ton
10%	\$.26.50
11%	28.50
12%	30.50
13%	32.50
14%	34.50
15%	37.00

Silvery Iron	
F.o.b. Jackson County, Ohio, Furnace	Per Gross Ton
6%	\$.21.00
7%	21.50
8%	22.00
9%	22.50
10%	23.00
11%	23.50
12%	24.00
13%	24.50
14%	25.00
15%	25.50
16%	26.00
17%	26.50
18%	27.00
19%	27.50
20%	28.00
21%	28.50
22%	29.00
23%	29.50
24%	30.00
25%	30.50
26%	31.00
27%	31.50
28%	32.00
29%	32.50
30%	33.00
31%	33.50
32%	34.00
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36%	36.00
37%	36.50
38%	37.00
39%	37.50
40%	38.00
41%	38.50
42%	39.00
43%	39.50
44%	40.00
45%	40.50
46%	41.00
47%	41.50
48%	42.00
49%	42.50
50%	43.00
51%	43.50
52%	44.00
53%	44.50
54%	45.00
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56%	46.00
57%	46.50
58%	47.00
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66%	51.00
67%	51.50
68%	52.00
69%	52.50
70%	53.00
71%	53.50
72%	54.00
73%	54.50
74%	55.00
75%	55.50
76%	56.00
77%	56.50
78%	57.00
79%	57.50
80%	58.00
81%	58.50
82%	59.00
83%	59.50
84%	60.00
85%	60.50
86%	61.00
87%	61.50
88%	62.00
89%	62.50
90%	63.00
91%	63.50
92%	64.00
93%	64.50
94%	65.00
95%	65.50
96%	66.00
97%	66.50
98%	67.00
99%	67.50
100%	68.00

Other Ferroalloys	
Ferrotungsten, per lb. contained metal del'd	\$.13 to \$.14
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace	\$.33.15 to \$.36.65
Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	\$.160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	\$.91.00
Ferrophosphorus, electric 24%, f.o.b. An-niston, Ala., per gross ton	\$.122.50

Fluxes and Refractories	
Fluorspar	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	\$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	\$.17.00 to \$.17.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick	
High-Heat Duty Brick	Per 1000 f.o.b. Works
Pennsylvania	\$43.00 to \$46.00
Maryland	43.00 to 46.00
New Jersey	50.00 to 65.00
Ohio	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Illinois	43.00 to 46.00
Ground fire clay, per ton	7.00

Silica Brick	
Per 1000 f.o.b. Works	
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	\$8.50 to 10.00

Magnesite Brick	
Standard sizes, f.o.b. Baltimore and Chester, Pa.	Per Net Ton
	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick	
Standard size	Per Net Ton
	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts	
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	Per Cent Off List
Machine bolts	.73
Carriage bolts	.73
Lag bolts	.73
Plow bolts, Nos. 1, 2, 3 and 7 heads	.73
Hot-pressed nuts, blank or tapped, square	.73
Hot-pressed nuts, blank or tapped, hexagons	.73
C.p.c. and t. square or hex. nuts, blank or tapped	.73
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including 1/2 in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts	
Semi-finished hexagon nuts, S.A.E.	Per Cent Off List
Stove bolts in packages, P'gh.	.80, 10, 10 and 5
Stove bolts in packages, Chicago	.80, 10, 10 and 5
Stove bolts in packages, Cleveland	.80, 10, 10 and 5
Stove bolts in bulk, P'gh.	.80, 10, 10, 5 and 2 1/2
Stove bolts in bulk, Chicago	.80, 10, 10, 5 and 2 1/2
Stove bolts in bulk, Cleveland	.80, 10, 10, 5 and 2 1/2
Tire bolts	.60, 10 and 10

Discounts of 73 per cent off on bolts and nuts apply on carload business with jobbers and large consumers.

Large Rivets	
(1/2-in. and larger)	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	\$.27.75
F.o.b. Chicago	2.85

Small Rivets	
(7/8-in. and smaller)	Per Cent Off List
F.o.b. Pittsburgh	.70, 10 and 5
F.o.b. Cleveland	.70, 10 and 5
F.o.b. Chicago	.70, 10 and 5

Cap and Set Screws	
(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)	Per Cent Off List
Milled cap screws	.80, 10, 10 and 5
Milled standard set screws, case hardened	.80 and 5
Milled headless set screws, cut thread	.75 and 10
Upset hex. head cap screws, U.S.S. thread	.85 and 10
Upset hex. cap screws, S.A.E. thread	.85 and 10
Upset set screws	.80, 10 and 5
Milled studs	.70

▲▲▲ Mill Prices of Finished Iron and Steel Products ▲▲▲

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.60c. to 1.65c.
F.o.b. Chicago.....	1.70c. to 1.75c.
Del'd Philadelphia.....	1.89c. to 1.94c.
Del'd New York.....	1.93c. to 1.98c.
F.o.b. Cleveland.....	1.60c. to 1.65c.
F.o.b. Lackawanna.....	1.70c. to 1.75c.
F.o.b. Birmingham.....	1.85c. to 1.90c.
C.i.f. Pacific ports.....	2.25c. to 2.30c.
F.o.b. San Francisco mills.....	2.25c.

Billet Steel Reinforcing

F.o.b. P'gh mills, 40, 50, 60-ft.....	1.70c. to 1.75c.
F.o.b. Birmingham, mill lengths.....	1.85c.

Rail Steel

F.o.b. mills, east of Chicago dist.....	1.55c. to 1.65c.
F.o.b. Chicago Heights mill.....	1.65c. to 1.70c.
Del'd Philadelphia.....	1.84c. to 1.89c.

Iron

Common iron, f.o.b. Chicago.....	1.70c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.09c.
Common iron, del'd New York.....	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.60c.
F.o.b. Chicago.....	1.70c. to 1.75c.
F.o.b. Birmingham.....	1.80c. to 1.85c.
Del'd Cleveland.....	1.78½c. to 1.83½c.
Del'd Philadelphia.....	1.80½c. to 1.85½c.
F.o.b. Coatesville.....	1.70c.
F.o.b. Sparrows Point.....	1.70c.
F.o.b. Lackawanna.....	1.70c.
Del'd New York.....	1.88c.
C.i.f. Pacific ports.....	2.05c. to 2.15c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.60c.
F.o.b. Chicago.....	1.70c. to 1.75c.
F.o.b. Birmingham.....	1.80c. to 1.85c.
F.o.b. Lackawanna.....	1.70c. to 1.75c.
F.o.b. Bethlehem.....	1.70c.
Del'd Cleveland.....	1.78½c.
Del'd Philadelphia.....	1.71c. to 1.76c.
Del'd New York.....	1.85½c.
C.i.f. Pacific ports.....	2.15c. to 2.25c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh.....	1.70c. to 1.75c.
Wider than 6 in., P'gh.....	1.60c. to 1.65c.
6 in. and narrower, Chicago.....	1.80c. to 1.85c.
Wider than 6 in., Chicago.....	1.70c. to 1.75c.
Cooperage stock, P'gh.....	1.90c. to 2.00c.
Cooperage stock, Chicago.....	2.00c. to 2.10c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill.....	2.10c.
Bars, f.o.b. Chicago.....	2.10c.
Bars, Cleveland.....	2.10c.
Bars, Buffalo.....	2.10c.
Shafting, ground, f.o.b. mill.....	2.45c. to 3.40c.
Strips, P'gh.....	2.35c. to 2.45c.
Strips, Cleveland.....	2.35c. to 2.45c.
Strips, del'd Chicago.....	2.63c. to 2.73c.
Strips, Worcester.....	2.50c. to 2.60c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland.....	3.60c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Merchant Trade

	Base per Keg
Standard wire nails.....	\$2.00 to \$2.10
Cement coated nails.....	2.00 to 2.10
Galvanized nails.....	4.00 to 4.10

	Base per Lb.
Polished staples.....	2.60c. to 2.70c.
Galvanized staples.....	2.85c. to 2.95c.
Barbed wire, galvanized.....	2.80c. to 2.90c.
Annealed fence wire.....	2.15c. to 2.25c.
Galvanized wire, No. 9.....	2.60c. to 2.70c.
Woven wire fence (per net ton to re-tailers).....	\$65.00

To Manufacturing Trade

Bright hard wire, Nos. 6 to 9 gage.....	2.30c.
Spring wire.....	3.30c.

(Carload lots, f.o.b. Chicago)

Wire nails.....	\$2.10 (keg)
Annealed fence wire.....	2.40c. to 2.50c. (lb.)
Bright hard wire to manufacturing trade.....	2.35c.

Anderson, Ind., mill prices are ordinarily \$1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill \$2 a ton over Pittsburgh, and Birmingham mill \$3 a ton over Pittsburgh.

Light Plates

Base per Lb.

No. 10, blue annealed, f.o.b. P'gh.....	1.90c. to 2.00c.
No. 10, blue annealed, f.o.b. Chicago dist.....	2.10c.
No. 10, blue annealed, del'd Phila.....	2.32c. to 2.42c.
No. 10, blue annealed, B'ham.....	2.15c.

Sheets

Blue Annealed

Base per Lb.

No. 13, f.o.b. P'gh.....	2.05c. to 2.15c.
No. 13, f.o.b. Chicago dist.....	2.25c.
No. 13, del'd Philadelphia.....	2.44c.
No. 13, blue annealed, B'ham.....	2.30c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.35c. to 2.45c.
No. 24, f.o.b. Chicago dist. mill.....	2.55c.
No. 24, del'd Philadelphia.....	2.64c. to 2.74c.
No. 24, f.o.b. Birmingham.....	2.60c. to 2.65c.

Steel Furniture Sheets

No. 24, f.o.b. P'gh.....	3.60c. to 3.70c.
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Galvanized

No. 24, f.o.b. Pittsburgh.....	3.00c. to 3.10c.
No. 24, f.o.b. Chicago dist. mill.....	3.10c. to 3.20c.
No. 24, del'd Cleveland.....	3.18½c. to 3.28½c.
No. 24, del'd Philadelphia.....	3.29c. to 3.39c.
No. 24, f.o.b. Birmingham.....	3.15c. to 3.20c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.70c. to 2.80c.
No. 28, f.o.b. Chicago dist. mill.....	2.80c. to 2.90c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	3.50c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill.....	3.45c. to 3.55c.
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Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh.....	3.80c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.00
Standard cokes, f.o.b. Gary.....	5.10

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. \$10.30	25-lb. coating I.C. \$15.20
15-lb. coating I.C. 12.90	30-lb. coating I.C. 16.00
20-lb. coating I.C. 14.00	40-lb. coating I.C. 17.80

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quantity Bar Base, 2.65c. per Lb.

S.A.E. Series	Alloy	Differential
2000 (1½% Nickel).....	0.25	\$0.25
2100 (1¼% Nickel).....	0.55	0.55
2300 (3¼% Nickel).....	1.50	1.50
2500 (5% Nickel).....	2.25	2.25
3100 Nickel Chromium.....	0.55	0.55
3200 Nickel Chromium.....	1.35	1.35
3300 Nickel Chromium.....	3.80	3.80
3400 Nickel Chromium.....	3.20	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum).....	0.50	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum).....	0.70	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum 1.25 to 1.75 Nickel).....	1.05	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium).....	0.35	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium).....	0.45	0.45
5100 Chromium Spring Steel.....	0.20	0.20
6100 Chromium Vanadium Bar.....	1.20	1.20
6100 Chromium Vanadium Spring Steel.....	0.95	0.95
9250 Silicon Manganese Spring Steel (flats).....	0.25	0.25
Rounds and squares.....	0.50	0.50
Chromium Nickel Vanadium.....	1.50	1.50
Carbon Vanadium.....	0.95	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¼c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	34.00
Light (from rail steel), f.o.b. mill.....	32.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base per 100 Lb.

Spikes, ½ in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plate, steel.....	2.07½

Angle bars.....	\$2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	73 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Inches	Steel	Black	Galv.	Inches	Iron	Black	Galv.
1½.....	47	21½	1½ and ¾.....	+11	+36		
2.....	53	27½	2.....	23	5		
2½.....	58	44½	¾.....	28	11		
3.....	62	50½	1 and 1¼.....	31	15		
1 to 3.....	64	52½	1½ and 2.....	35	18		

Lap Weld

2.....	57	45½	2.....	28	9
2½ to 6.....	61	49½	2½ to 3½.....	28	13
7 and 8.....	58	45½	4 to 6.....	30	17
9 and 10.....	56	43½	7 and 8.....	29	16
11 and 12.....	55	42½	9 to 12.....	26	11

Butt Weld, extra strong, plain ends

1½.....	43	26½	1½ and ¾.....	+13	+48
2.....	49	32½	2.....	23	7
2½.....	55	44½	¾.....	28	12
3.....	60	49½	1 to 2.....	34	18
1 to 1½.....	62	51½			
2 to 3.....	63	52½			

Lap Weld, extra strong, plain ends

2.....	55	44½	2.....	29	13
2½ to 4.....	59	48½	2½ to 4.....	34	20
4½ to 6.....	58	47½	4½ to 6.....	33	19
7 to 8.....	54	41½	7 and 8.....	31	17
9 and 10.....	47	34½	9 to 12.....	21	8
11 and 12.....	46	33½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discount of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel	Charcoal Iron
2 in. and 2½ in.....	38
2½ in.—2¾ in.....	46
3 in.....	52
3½ in.—3¾ in.....	54
4 in.....	57
4½ in. to 6 in.....	46
1½ in.....	1
1¾ in.....	8
2 in.—2¼ in.....	13
2½ in.—2¾ in.....	16
3 in.....	17
3½ in. to 3¾ in.....	18
4 in.....	20
4½ in.....	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.....	61	3 in.....	46
1½ to 1¾ in.....	53	3½ to 3¾ in.....	49
1¾ in.....	37	4 in.....	51
2 to 2½ in.....	32	4½, 5 and 6 in.....	40
2½ to 2¾ in.....	40		

Hot Rolled

2 and 2½ in.....	38	3½ to 3¾ in.....	54
2½ and 2¾ in.....	46	4 in.....	57
3 in.....	52	4½, 5 and 6 in.....	46

Beyond the above base discount a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30% base (carloads).....	55
Carbon, 0.30% to 0.40% base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

Fabricated Structural Steel

New Projects of 49,000 Tons Include 15,000 Tons of Subways—Awards Total 30,500 Tons

NEW fabricated structural steel projects total about 49,000 tons this week, the largest since the first week in September and more than double the total a week ago. Included are 12,500 tons for a section of New York subway in the borough of Queens, 2500 tons for a subway section in Philadelphia, 3500 tons for an office building in San Francisco and more than 6000 tons for five apartment buildings in New York.

Awards of fabricated steel totaling 30,500 tons were larger than in either of the previous two weeks and included 5245 tons for highway bridges in Kentucky, 3550 tons for a State office building in Columbus, Ohio, and 2400 tons for oil storage tanks in Cincinnati for the Gulf Refining Co.

Total awards of fabricated steel in the New York district in September was the smallest of the year, according to the Structural Steel Board of Trade, which reports 25,974 tons, compared with 61,689 tons in August, and 56,155 tons in September of last year. Awards follow:

North Atlantic States

CAMBRIDGE, MASS., 185 tons, Harvard biological laboratory, to Eastern Bridge & Structural Co.
SOUTHBORO, MASS., 100 tons, hospital, to Palmer Steel Co.
NEW YORK, 700 tons, temporary subway framing and bracing, to Bethlehem Steel Co.
NEW YORK, 1050 tons, building at 1175 Madison Avenue, to Hay Foundry & Iron Works.
NEW YORK, 410 tons, subway section 3, route 101, Worth Street connection, to Bethlehem Steel Co.
NEW YORK, 215 tons, underflooring of Manhattan Bridge, to E. O. Roberts, general contractor.
SAFE HARBOR, PA., 1125 tons, gates and intake equipment for Safe Harbor Water Corporation, to M. H. Treadwell Co.
LEHIGH & NEW ENGLAND RAILROAD, 165 tons, bridge in New Jersey, to Bethlehem Steel Co.
BEAVER LAKE, N. J., 190 tons, for bridge, to American Bridge Co.
UNION CITY, N. J., 325 tons, addition to Catholic school, to Schaeffer Construction Co., Newark.
PHILADELPHIA, 230 tons, warehouse, to Wheeling Corrugated Co.

The South

STATE OF KENTUCKY, 5245 tons, highway bridges; 3245 tons to Nashville Bridge Co., 2000 tons to Virginia Bridge & Iron Co.
NORFOLK & WESTERN RAILROAD, 490 tons, bridge, to Virginia Bridge & Iron Co.
TEXAS & PACIFIC RAILROAD, 160 tons, bridge at Texarkana, Tex., to Virginia Bridge & Iron Co.

Central States

CINCINNATI, 2400 tons, oil storage and refinery tanks for Gulf Refining Co., to Ritter-Conley division, McClintic-Marshall Co.
COLUMBUS, OHIO, 3557 tons, State office building, to McClintic-Marshall Co.
DAYTON, 2550 tons, Mutual Home Bank building, to Dayton Structural Steel Co.
WARASH RAILROAD, 150 tons, bridge, to American Bridge Co.
CARROLLVILLE, WIS., 400 tons, chemical plant extension for Newport Co., to Wisconsin Bridge & Iron Co.
MILWAUKEE ROAD, 250 tons, plate girders, to an unnamed bidder.
CHICAGO, 1250 tons, Senn High School, to Eggers Schillo Co., Chicago.

Western States

OLYMPIA, WASH., 300 tons, Hoh River bridge, to Wallace Bridge & Structural Steel Co.

SAN FRANCISCO, 216 tons, theater on Ocean Avenue, to Golden Gate Iron Works.
SAN FRANCISCO, 100 tons, three ward buildings and an apartment house on Pacific Street, to McClintic-Marshall Co.
LOS ANGELES, 1800 tons, State building to Consolidated Steel Corp.
LOS ANGELES, 2000 tons of plates and sheets for General Hospital, to Hollow Metal Door Trim Co.

Canada

COPPER CLIFF, ONT., 5000 tons for refinery unit for International Nickel Co. of Canada, to Dominion Bridge Co.

STRUCTURAL PROJECTS PENDING

Inquiries for fabricated steel work include the following:

North Atlantic States

SALEM, MASS., 100 tons, laundry.
NEW YORK, 1000 tons, apartment building, 302 West Eighteenth Street.
NEW YORK, 2300 tons, apartment building, 40 to 48 West Fifty-eighth Street.
NEW YORK, 800 tons, apartment building, Christopher and Greenwich streets.
NEW YORK, 750 tons, apartment building, Seventy-second Street and First Avenue.
NEW YORK, 1300 tons, apartment house at Eighth Avenue and Twelfth Street for Bing & Bing.
NEW YORK, 12,500 tons, section 6, route 108, Queens subway.
EAST ORANGE, N. J., 900 tons, building for B. Altman & Co.
PHILADELPHIA, 2500 tons, subway section, bids due Oct. 15 at Department of Public Works.

The South

MEMPHIS, TENN., 200 tons, two pile driver barges for United States Engineer; bids Oct. 7.
BALTIMORE & OHIO RAILROAD, 2350 tons, bridge over Potomac River in Virginia.

Central States

DETROIT, 2000 tons, bar mill for Great Lakes Steel Corp.
CLEVELAND, 300 tons, West Forty-first Street bridge for Big Four Railroad.
HAMILTON, OHIO, 160 tons, Second National Bank.
EVANSVILLE, IND., 9000 tons, Indiana highway bridge.
EVANSVILLE, 2000 tons, McCurdy Hotel.
CHICAGO, 2000 tons, ore bridges for Inland Steel Co.
LANSING, IOWA, 1200 tons, highway bridge over Mississippi River.
DAVENPORT, IOWA, 750 tons, hotel and theater.
MAHASKA COUNTY, IOWA, 600 tons, highway bridge.

BURLINGTON, IOWA, tonnage being estimated, Iowa Bell Telephone Co.
DUBUQUE, IOWA, 200 tons, Masonic Temple.

Western States

SAN FRANCISCO, 3500 tons, Mills Building; bids Oct. 9.
SAN DIEGO, CAL., 260 tons, plates, one 55,000-bbl. tank for Naval Operating Base; Oberg Brothers, general contractors.

Canada

VANCOUVER, B. C., 2000 tons, repairs to second span of Narrows Bridge for Burrard Inlet Tunnel & Bridge Co., North Vancouver.

Mexico

MEXICO CITY, 450 tons, building for an unnamed owner.

Railroad Equipment

Swift & Co., Chicago, are inquiring for 200 to 700 steel underframes for refrigerator cars.

C. C. B. Smokeless Coal Co., Mount Hope, W. Va., has ordered 150 mine cars from Sanford-Day Iron Works and 50 from Watt Mining Car Wheel Co.

Maine Central is inquiring for five gondola cars and two to four eight-wheel switching locomotives.

Coal Stocks Available for 32 Days

Industrial supplies of bituminous coal in the United States are estimated by the National Association of Purchasing Agents as of Sept. 1 to have been sufficient for 32 days' use at current rate of consumption. By-product coke plants had supplies for 32 days; electric utilities, for 61 days; railroads, for 20 days; steel mills, for 45 days, and other industries for 32 days.

Industrial consumption during August was placed at 29,817,000 net tons. This was a drop of more than 2 per cent from the July rate and represented much the smallest tonnage in considerably more than a year. Production during the month was 41,851,000 tons, both anthracite and bituminous, and the quantity on hand in industries on Sept. 1 was 33,720,000 tons.

Detroit Scrap Market Weak

DETROIT, Oct. 7.—The scrap market has weakened perceptibly the past week, with the result that cast iron grades are off from 25c. to 50c. a ton. Blast furnace items are virtually at a standstill, while heavy melting steel is sluggish. Dealers are of the opinion that the present drifting state of the market is likely to continue the remainder of the month.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	\$11.25 to \$11.75
Borings and short turnings	5.50 to 6.00
Long turnings	5.50 to 6.00
No. 1 machinery cast	10.50 to 11.00
Automotive cast	12.25 to 12.75
Hydraul. comp. sheets	11.25 to 11.75
Stove plate	8.75 to 9.25
New No. 1 busheling	9.25 to 9.75
Old No. 2 busheling	5.50 to 6.00
Sheet clippings	8.00 to 8.50
Flashings	10.00 to 10.50

▲▲▲ Non-Ferrous Metal Markets ▲▲▲

Copper Firm and Active— Tin at New Low—Lead and Zinc Reduced

NEW YORK, Oct. 7.

Copper

Since the 10c. level for electrolytic copper was established a week ago, buying has been quite heavy. Sales to foreign consumers have been the largest in a long time, the total on Friday, Oct. 3, having been about 5375 tons. Including this morning's sales, the month's total has been about 18,500 tons, which compares with about 25,000 tons for all of September. Domestic consumers are buying as much as they are allowed to, the policy of most producers being one of restraint in pressing the market and of taking care only of regular customers. It is also the policy of all producers except one not to sell any metal beyond December. Some for January delivery, however, has been disposed of by the one company and in a few cases a little January metal has been linked up with last quarter contracts. Thus far, prices are very firm at 10c., delivered in the Connecticut Valley, and at 10.30c. for export, c.i.f. usual European ports. Demand for Lake copper is quite heavy, one company having practically sold its output at the prevailing quotations of 10c. to 10.12½c. delivered.

Opinions in the trade as to the future course of the market differ. Some believe that the bottom has been reached, and attempts have been made to advance the price for export, but nothing thus far has materialized. Another opinion is to the effect that, unless there is quite soon some definite announcement of decided curtailment in production, prices will go lower. Announcement of the statistics for September, which will appear within a week, are expected to show further increase in stocks of refined metal.

Tin

Spot Straits tin today, at 27.37½c., New York, reached a new low quotation, the lowest since the early fall of 1921. London prices are also down decidedly today with spot standard quoted at £122, future standard at £123 10s. and spot Straits at £125, with the Singapore price at £128 12s. 6d. Because of a declining market, buying, which was heavy a week ago, has fallen off, consumers having purchased enough for the present. Their policy is to wait for possible further breaks. The world's visible supply on Oct. 1 showed a decline of 3655 tons, bringing the total to 40,150 tons. Stocks in London warehouses on Oct.

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Oct. 7	Oct. 6	Oct. 4	Oct. 3	Oct. 2	Oct. 1
Lake copper, New York.....	10.12½	10.12½	10.12½	10.12½	10.12½	10.12½
Electrolytic copper, N. Y.*.....	9.75	9.75	9.75	9.75	9.75	9.75
Straits tin, spot, N. Y.	27.37½	27.90	....	27.90	27.90	27.90
Zinc, East St. Louis.....	4.20	4.20	4.20	4.20	4.20	4.22½
Zinc, New York.....	4.55	4.55	4.55	4.55	4.55	4.57½
Lead, East St. Louis.....	5.10	5.10	5.20	5.20	5.20	5.35
Lead, New York.....	5.25	5.25	5.35	5.35	5.35	5.50

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

4 were 25,102 tons, a decline for the week of 46 tons.

A persistent report, to which considerable credence is accorded, was agitating the market today to the effect that the Tin Producers' Association in London is about to dissolve. Two London houses are quoted as saying that the report is probable, and it is stated that the head of one of the low-cost producers has resigned from the association. If this materializes, lower prices may result.

Lead

On Thursday, Oct. 2, and on Saturday, Oct. 4, the American Smelting & Refining Co. made reductions in its contract quotation, the price today standing at 5.25c., New York, as against 5.50c. a week ago. The corresponding price at St. Louis in the outside market is 5.10c. Continued reductions in the London market are

the cause. Demand, which has been confined to carload and small lots, mostly for October delivery, has naturally fallen off.

Zinc

Statistics for September out today put a further damper on an already more or less demoralized market. They showed an increase of about 10,000 tons in stocks of refined metal. Demand for prime Western, which for some little time has been light, is even lighter now and prices are largely nominal at 4.20c. to 4.22½c., East St. Louis, or 4.55c. to 4.57½c., New York.

Production of ore in the Joplin district continues large, with the output last week at 9000 tons and shipments at 8700 tons. Purchases by smelters were 8650 tons at the unchanged price of \$30 a ton. An encouraging feature in the market for the metal

New York, Chicago or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass	17.00c.
Copper, hot rolled, base sizes.....	20.00c.
Copper, cold rolled, 14 oz. and heavier, base sizes.....	22.00c.
Seamless Tubes—	
Brass	22.00c.
Copper	22.25c.
Brass Rods	15.12½c.
Brazed Brass Tubes.....	24.67½c.

New York Warehouse

Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks	9.75c. to 10.25c.
Zinc sheets, open.....	10.75c. to 11.25c.

Metals from New York Warehouse

Delivered Prices, per Lb.

Tin, Straits pig.....	30.50c. to 31.50c.
Tin, bar	32.50c. to 33.50c.
Copper, Lake	11.75c.
Copper, electrolytic	11.50c.
Copper, casting	11.25c.
Zinc, slab	6.00c. to 7.00c.
Lead, American pig.....	6.00c. to 7.00c.
Lead, bar	8.00c. to 9.00c.
Antimony, Asiatic	10.00c. to 10.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure).....	24.00c. to 25.00c.
Alum. ingots, No. 12 alloys	23.00c. to 24.00c.
Babbitt metal, commercial grade	25.00c. to 35.00c.
Solder, ½ and ½.....	22.00c. to 23.00c.

Metals from Cleveland Warehouse

Delivered Prices, per Lb.

Tin, Straits pig.....	32.50c.
Tin, bar	34.50c.
Copper, Lake	11.13c.
Copper, electrolytic	11.13c.
Copper, casting	10.75c.
Zinc, slab	5.75c. to 6.00c.
Lead, American pig.....	6.00c. to 6.25c.
Lead, bar	8.75c.
Antimony, Asiatic	12.50c.
Babbitt metal, medium grade.....	16.50c.
Babbitt metal, high grade.....	36.00c.
Solder, ½ and ½.....	20.25c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses. (Prices quoted are nominal. Holders of metal are generally unwilling to part with stock at present low levels.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	8.25c.	9.00c.
Copper, hvy. and wire	8.00c.	8.75c.
Copper, light and bottoms	7.00c.	8.00c.
Brass, heavy.....	4.75c.	5.75c.
Brass, light	3.75c.	5.00c.
Hvy. machine composition	7.25c.	8.25c.
No. 1 yel. brass turnings	5.00c.	5.75c.
No. 1 red brass or compos. turnings...	6.50c.	7.50c.
Lead, heavy	4.00c.	4.50c.
Lead, tea	2.75c.	3.25c.
Zinc	2.25c.	2.75c.
Sheet aluminum.....	7.50c.	9.50c.
Cast aluminum.....	7.00c.	9.00c.

is the under-bought condition of most consumers.

Antimony

The market is still quiet and Chinese metal is quoted unchanged at 7.50c., duty paid, New York, for all positions.

Nickel

Long-established quotations are unchanged at 35c. a lb. for wholesale lots of ingot nickel, with shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

Aluminum

Virgin metal, 98 to 99 per cent pure, is obtainable at the published price of 22.90c. a lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Oct. 7.—All quotations are lower with the exception of antimony. Sales are spotty but in about the same volume as in the previous week. Prices are giving way in the old metal market which is quiet.

Prices per lb., in carload lots: Lake copper, 10.12½c.; tin, 28.75c.; lead, 5.20c.; zinc, 4.32½c.; in less-than-carload lots, antimony, 8.75c. On old metals we quote copper wire, crucible shapes and copper clips, 7.50c.; copper bottoms, 6.50c. to 7c.; red brass, 6.50c. to 7c.; yellow brass, 4.50c. to 5c.; lead pipe, 3.75c. to 4c.; zinc, 1.50c. to 1.75c.; pewter, No. 1, 15c.; tin-foil, 16c.; block tin, 22c.; aluminum, 6.50c. to 7c.; all being dealers' prices for less-than-carload lots.

Buffalo Pig Iron Rates to Some Points Reduced

WASHINGTON, Oct. 7.—In a decision made public last Friday, the Interstate Commerce Commission ordered the Pennsylvania Railroad to apply rates of \$3.53 to \$4.54 respectively per ton on pig iron from the Buffalo district to Williamsport and Harrisburg, Pa., and \$4.79 to Columbia, York and Wrightsville, Pa. The rates from Buffalo charged by the railroad have been \$3.91 to Williamsport and \$4.91 to other destinations. Reparation was awarded. The rate from the Buffalo district to Littlestown, Pa., was held to be not unreasonable. Complaint against the rates was made by the Harrisburg Foundry & Machine Co. and numerous other pig iron consumers at the affected destinations.

Locomotive Shipments in 9 Months Above 1929

WASHINGTON, Oct. 7.—Shipments of railroad locomotives in September represented 65 units, against 77 in August, according to the Department of Commerce. They were made up of 62 steam and three electric locomotives, all for domestic account.

Unfilled orders at the end of September totaled 174 units, of which 136

steam and 34 electric locomotives were for domestic account and four electric units were for foreign account. Unfilled orders at the end of August totaled 234 units.

Total shipments for the first nine months of 1930 exceeded by 25 those in the corresponding period of 1929, having been 617 and 592, respectively. There was a gain of 104 steam locomotives for domestic account, partly offset by losses of 15 in domestic electric locomotives, and 64 in steam locomotives for export.

Lake Superior Iron Ore Shipments Declining

Water shipments of Lake Superior ore during September were 6,488,088 tons, a decrease of 3,058,952 tons, or 32.04 per cent, compared with September, 1929. September showed a rather sharp decline in movement as compared with August, when shipments amounted to 8,251,691 tons. The total movement by water up to Oct. 1 was 39,064,009 tons, a decrease of 14,200,818 tons, or 26.66 per cent, as compared with the same period last year. Indications are that the season's movement will run quite a little below 50,000,000 tons.

George M. Verity Sees Era of Prosperity Ahead

George M. Verity, chairman, American Rolling Mill Co., Middletown, Ohio, is quoted as having told a delegation of Cincinnati bankers and brokers who visited him to learn his views as to the business outlook that this country will soon enter upon five years of the greatest prosperity it has ever had.

"When this cycle of depression has run its course," Mr. Verity said, "you can be assured that this country will have the greatest five years of prosperity in its existence. I cannot feel but that we have tremendous development prospects in all industries ahead of us."

The dull period will have helped industry, Mr. Verity said, by disclosing the faults and weak spots.

Steel Institute Announces Technical Program

The following technical program has been arranged for the thirty-eighth general meeting of the American Iron and Steel Institute at the Hotel Commodore, New York, Friday, Oct. 24:

"The Structures of the High-Chromium Stainless Steels and Irons," by E. C. Bain, research department, United States Steel Corp., New York.

"Transportation Within the Steel Plant," by D. M. Petty, Bethlehem Steel Co., Bethlehem, Pa.

"A Recording Dust Concentration Meter for Blast Furnace Gas," by Dr. A. W. Simon, Tennessee Coal, Iron & Railroad Co., Birmingham.

"Some Recent Developments in the Cold Rolling of Strip Steel," by Stephen Badlam, consulting engineer, Pittsburgh.

"Scope and Efficiency of Dry Cleaning of Coals," by Major K. C. Appleyard, managing director, Birtley Iron Co., Ltd., England, and Edward O'Toole, general superintendent, United States Coal & Coke Co., Gary, W. Va.

Papers will be delivered at morning and afternoon sessions. The usual banquet will be held in the evening.

Reinforcing Steel

Awards 6000 Tons—5000 Tons Added to Pending Work

QUIETNESS prevailed in reinforcing steel business the past week. Awards totaled 6000 tons, the largest 2800 tons for a power house and dam at Rock Island, Wash. New projects call for 5000 tons, of which 2000 tons will be used in a merchandise mart at St. Louis. Awards follow:

CAMBRIDGE, MASS., 850 tons, Harvard laboratory, to Concrete Steel Co.

BERGEN COUNTY, N. J., 500 tons, State highway, section 7, route 4, Passaic River bridge and approaches; placed by Maggi & Schoonover, Paterson, N. J., with Igoo Brothers.

WHITE PLAINS, N. Y., 100 tons, bridge for Westchester County Park Commission, contract No. 188, to Concrete Steel Co.

HOBOKEN, N. J., 100 tons, factory for Cornell & Underhill, Spring and Greenwich Streets, New York, to Joseph T. Ryerson & Son.

ALBANY, N. Y., 100 tons, Delaware & Hudson grade crossings, to a Buffalo fabricator.

ROCHESTER, N. Y., 100 tons, Monroe County power house, to a Buffalo fabricator.

NIAGARA FALLS, N. Y., 200 tons, Hyde Park School, to a Buffalo bidder.

AURIESVILLE, N. Y., 100 tons, steel joists for shrine, to McClintic-Marshall Co.

BUFFALO, 300 tons, Bailey Avenue market terminal, steel mesh, to Wickwire Spencer Steel Co.

BUFFALO, 100 tons, steel joists for St. John parish house, to a local bidder.

CHICAGO, 100 tons, Senn high school, to Concrete Engineering Co.

LOS ANGELES, 302 tons, Atlantic Avenue bridge over Los Angeles River, to an unnamed bidder.

LOS ANGELES, 172 tons, two storm drain projects, Little Dalton Wash, to Soule Steel Co.

OAKLAND, CAL., 134 tons, two bridges over Crandell Slough, to an unnamed bidder.

ROCK ISLAND, WASH., 2800 tons, power house and dam, to Pacific Coast Steel Corp.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BOSTON, 160 tons, New England medical center.

BOSTON, 165 tons, L Street bath house.

HARTFORD, CONN., 100 tons, junior high school.

NEW YORK, 1000 tons, penitentiary at Riker's Island.

NEW YORK, 210 tons, Institute for Crippled and Disabled Children; Voorhees, Gmellin & Walker, architects.

YOUNGSTOWN, 1100 tons, filtration plant.

CHICAGO, 200 tons, Steinmetz public school.

ST. LOUIS, 2000 tons, merchandise mart.

Pratt & Whitney Co. Celebrates Seventieth Birthday

THE Pratt & Whitney Co., Hartford, Conn., celebrated its seventieth anniversary on Oct. 1 at a banquet at the Hartford Club, which was attended by many notable men in industry. The dinner guests numbered about 350. At the speakers' table were Col. Edward A. Deeds, chairman of the board of the Niles-Bement-Pond Co., of which the Pratt & Whitney Co. is a subsidiary; Clayton R. Burt, president, Pratt & Whitney Co.; Clarence E. Whitney, president, Whitney Chain Co., and son of Amos Whitney, who, with Francis A. Pratt, founded the Pratt & Whitney business; Ambrose Swasey of the Warner & Swasey Co., Cleveland, who, with Mr. Warner, got his start in the Pratt & Whitney plant before founding his own business; George A. Long, president, Gray Telephone Pay Station Co., who learned his trade in the Pratt & Whitney shops; and Henry D. Sharpe, president of Brown & Sharpe Mfg. Co., Providence, R. I.

Colonel Deeds, who was the prin-

cipal speaker, paid tribute to the men who have been responsible for the development of the Pratt & Whitney Co., many of whom have spent most of their lives in its service. He spoke of the great number of men who had served their apprenticeship with Pratt & Whitney and who had gone out to establish businesses of their own and eventually to become leaders in other great industries.

Referring to the present business situation, Colonel Deeds refrained from making any prophecy as to when a real turn may come, and said that this depression will end as others have ended, and that the country will wake up some morning and find that the upswing has started.

Every guest at the dinner was presented with an illustrated book of 118 pages with cloth binding, entitled "Accuracy for 70 Years." This book contains a history of the Pratt & Whitney Co., illustrations of the progressive development in machine tool design and manufacture, and photo-

graphs of the various plants the company has occupied, including one of the first buildings, erected on the present site in 1865.

An interesting feature of the book is a list of employees who have long records of service, the oldest, Charles Kummel, having been with the company for 66 years. Including Mr. Kummel, there are nine who have worked in the Pratt & Whitney shops for 50 years or longer, three whose length of service ranges from 45 to 50 years, seven with 40 to 45 years to their credit, and a great many others who have worked for the company for periods ranging from 20 to 40 years.

Several pages in the book are devoted to reproductions of medals and other awards the company has received for superiority of workmanship.

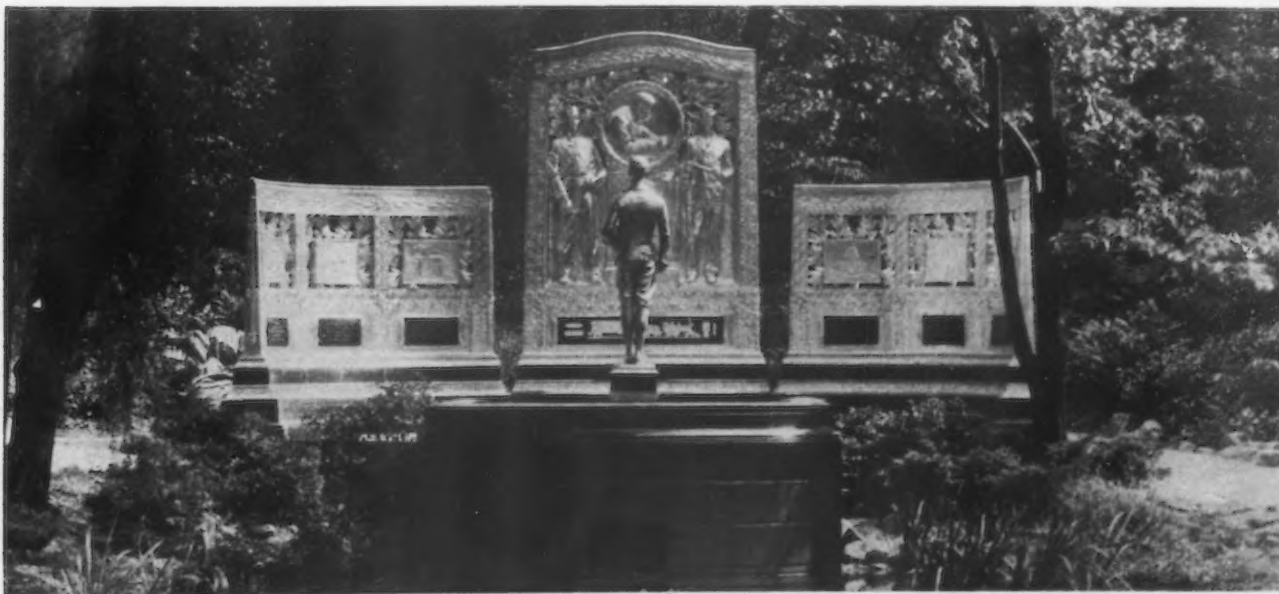
A feature of the banquet was a transatlantic telephone conversation with Hugh L. Purdy, head of Pratt & Whitney's English selling agents, Buck & Hickman, Ltd., who, in a talk from Surrey, England, extended congratulations. The transatlantic telephone conversation was amplified so that everyone present could hear it.

THE bronze memorial to the late George Westinghouse shown in the accompanying illustration was dedicated in Schenley Park, Pittsburgh, on Oct. 6. A tribute by 54,251 members of the Westinghouse Memorial Association composed of employees of companies bearing the Westinghouse name, the memorial rises in four sections from a Norwegian granite base. In the central panel Mr. Westinghouse is depicted at his drawing board, flanked by an engineer and a skilled mechanic typical of their professions. Facing this panel is a rugged statue representing American Youth. Both the central panel and the statue are the work of Daniel Chester French. To the right and left of the central panel are six lesser bronzes by Paul Fjelde,

depicting the foremost mechanical achievements of the Westinghouse career—the railroad air brake, the automatic switch and signal, installation of the first hydroelectric plant at Niagara Falls, the alternating current lighting system at the Chicago World's Fair, the steam turbine and the electric locomotive.

E. M. Herr, vice-chairman of the board of the Westinghouse Electric & Mfg. Co., presided at the dedicatory exercises, and A. L. Humphrey, president of the Westinghouse Air Brake Co., delivered one of the principal addresses.

The memorial was presented to the city by George Munro, representing the Westinghouse Veterans Association.



Automobile Production in Last Quarter Depends on Retail Sales

DETROIT, Oct. 6.
IT is the fashion these days to paint a vivid word picture of the chaos and feeling of panic which prevail in this city as a result of the industrial depression. Unsubstantiated reports have got into print that the Ford organization would undergo a month's enforced vacation before the end of the year. Under such circumstances it is well to pause and view the situation without exaggeration, but with recognition of the seriousness of present conditions.

Despite the fact that production rates leave much to be desired, there is a tone of confidence in the automobile industry. Executives are of the opinion that the worst has passed and a slow but steady recovery lies ahead. It is true that little, if any, upturn in output can be expected during the remainder of the year, for past experience points to a quiet fourth quarter. However, some observers believe that the last three months of 1930 relatively will make a better showing compared with the preceding nine months than the same period in other years.

SEPTEMBER production figures for the United States and Canada, judging by unofficial reports, are likely to hover around the 200,000 mark. Part of the decline from August is

due to reduced operations by the Ford Motor Co. and part to the restricted assemblies of the Chevrolet company during the preparatory period for its new models. Since Ford and Chevrolet together make about 70 per cent of all cars, the upward or downward trend of production depends largely on their activities. The Rouge plant of the Ford Motor Co. operated three days last week for the second consecutive week. The company's manufacturing program is not being mapped out 30 or 60 days ahead, as some reports have inferred. Nor can its monthly releases of materials be taken as an accurate guide of its future course, for it readjusts its buying from time to time to conform to current requirements. It can be officially said that Ford is gaging its weekly activities solely by the volume of retail sales made by dealers, adjusting its schedules to meet the conditions which exist at the moment. Incidentally, Ford's production in September came closer to the August output than many people had anticipated.

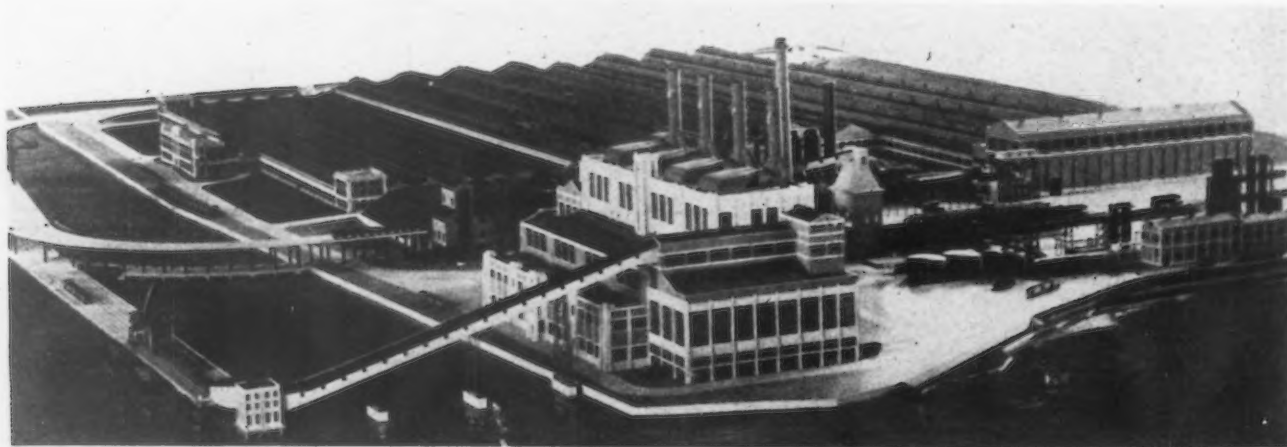
Chevrolet is sanguine of success for its 1931 car, which will be revealed to the public early next month. Most recent reports have it that the body design will be a radical change from the present model and that the en-

gine and car itself will be heavier. The company still is holding to a schedule of from 50,000 to 60,000 cars for October and is hopeful that November will see a continuation of this program. Buick has cut down its output this month to approximately 10,000 cars, as against 13,000 in September and 20,000 in August. Oakland-Pontiac is likely to do little in the next 30 days. Cadillac is bringing out its V-12 and also is busy turning out V-8 and V-16 Cadillacs and the LaSalle. Its assemblies are running around 175 cars a day five days a week. Packard's new car is taking well with the public, with manufacturing going along at 125 a day five days a week.

Chrysler Reduces Prices

CHRYSLER is engaged in trying to overcome an unhappy sales situation by reducing the prices of Chrysler sixes \$50 and Dodge sixes and eights \$100. The new lineup puts the Chrysler six in a range from \$745 to \$875, f.o.b. factory. The Dodge six is now selling at \$735 to \$835 and the eight at \$995 to \$1,095, the lowest prices in Dodge history. September shipments of Chrysler-built cars amounted to 15,736, compared with 18,148 in August and 37,985 in September, 1929. Hudson is working on

New Ford Plant in England to Have Annual Capacity of 200,000 Cars



THIS model of the Ford Motor Co.'s new plant at Dagenham, England, now under construction, is on display at the automobile company's sales room at 88 Regent Street, W. I., London, England. The new plant, some details of which were printed on page 960 of the Oct. 2 issue of *THE IRON AGE*, will have capacity for 200,000 automobiles a year and will give employment to 15,000 British workers. It will export Ford cars and trucks to all parts of the world. The 500-ton blast furnace that is to be a part of the plant will be the first in the south of England. Hot metal from this furnace will be used in the foundry, which will be equipped with electric furnaces. The plant will be completed in 1931.

its new line, which should be out in November. It is thought that the company will find it advisable to widen the quality gap between the Hudson and the Essex to get away from the idea that the difference between the two is not enough to justify the added price of the former.

Reo Has New Type of Fenders

Reo is confident that its new Flying Cloud and Royale Eight models will meet with success, despite the slowness of the general retail market. Fenders on the Royale Eight constitute the first really radical departure in the design of these units since the introduction of the full-crowned type. They differ from the conventional not only in general outline, but also in detail and in method of production. Front fenders have a minimum of curvature from the top of the crown to the frame side rails over which they extend, giving the car the appearance of being cradled in the fenders when looked at from the front. Heretofore it has been customary to finish off the fender edge with a bead, but on the Royale Eight the edge is turned under so that it is not visible, thereby softening the fender line. The rear fenders also have the same rounded edge. Another unusual feature in body construction is the center pillar. It is of T-section steel, rigidly bolted through double plates to body sills and roof side rail. Both doors of the sedan are hung on this narrow pillar with a single set of hinges, which makes possible the use of wider doors. Steel running boards have chromium-trimmed, rubber, beading and bakelite insets, giving an unusual effect. The Reo factory is said to be operating on a basis of 100 cars a day five days a week.

October Showing Depends on Ford and Chevrolet

THAT Ford's October production will be less than in September seems probable, especially if the Rouge plant continues, as is likely, on its three-day-a-week program, as against four days during the first half of the month. This reduction will be either partially or wholly offset by the betterment in Chevrolet activities. Upon the performance of these two leaders rests October's place in the year's ranking. The consensus of opinion is that the month will be either equal to or possibly slightly less than September. Scarcely anyone familiar with the industry is holding out hope of a gain.

Most encouraging is the situation in regard to dealers' stocks, which are in a healthy condition throughout the country. They are sufficiently low that the slightest improvement in retail sales will be reflected instantly in a pickup in factory assemblies. The retail market is following the usual seasonal downward trend and is expected to be somewhat quiet the remainder of the year. Probably the best condition in the industry is reported by independent truck makers

Ford continues to operate three days a week at Rouge plant, where production from week to week is being guided solely by current retail sales. Other manufacturers likewise are using the same measuring stick to determine output.

* * *

Chrysler six and Dodge six and eight have been reduced in price in effort to stimulate sales.

* * *

Buick's October schedule reported to be 10,000 cars, compared with 13,000 in September and 20,000 in August.

* * *

October automobile production is likely to be close to September mark, the showing depending largely on what Ford and Chevrolet do.

(those not operated as a commercial car division of a passenger car company), which are maintaining output and sales considerably above the usual seasonal rate.

Automobile Makers Cooperating to Combat Unemployment

Detroit is attacking its unemployment problem with vigor. At a special meeting in Mayor Murphy's office the past week there were gathered such powerful figures in the automobile world as Edsel Ford, Walter P. Chrysler, Alvan Macauley, Joseph B. Graham, Lawrence P. Fisher, Charles T. Fisher and William J. McAneeny. An attempt is being made to stagger employment by dividing available work among as many men as possible. One automobile factory has added 900 employees in the last few days and will operate its forces in shifts so that all men will be on duty part of the time. The plan is to give just as many families as possible some income, even though it may be far below a normal level.

Estimate Car Needs For Fourth Quarter

WASHINGTON, Oct. 7.—Iron and steel shipments in the final quarter of 1930 will require 433,883 cars, or only 5.8 per cent under the 460,805 cars required in the last quarter of 1929, according to an estimate of the Shippers' Regional Advisory Boards, American Railway Association.

Machinery and boilers will require 46,944 cars, it is estimated, a reduction of 14.9 per cent under the 55,146 carload shipments in the last quarter of 1929. Coal and coke requirements are estimated at 2,606,386 cars, a decrease of 6.6 per cent under the 2,790,470 in the final quarter of 1929. Requirements for ore and concentrates

are estimated at 341,725, a decrease of 20.2 per cent under the 428,144 required in the last quarter one year ago.

Requirements for all the 29 principal commodities dealt with in the report are estimated at 7,655,792 cars, a decrease of 7.3 per cent when compared with the 8,255,912 cars required in the last quarter of 1929.

Manufacture of Aluminum Products Shows Gain

Output of aluminum products in 1929 by 139 establishments totaled \$147,307,270, against \$123,557,112 produced in 1927 by the same number of plants, according to the Bureau of the Census. This shows a gain of 19.2 per cent.

Some of the items which enter into the total for 1929 are aluminum kitchen and household appliances, other than electric, \$28,567,876; other aluminum ware, \$6,094,956; motor vehicle accessories and parts, \$11,719,444; castings not included in the foregoing, \$21,164,807.

The value of aluminum products made in plants outside of the industry proper in 1927 was \$21,352,976. The 1929 figures for this class of producers are not yet available.

The largest gain made was in the production of aluminum ware, which rose 23.4 per cent to \$35,784,130, from \$28,988,708 in 1927. The heaviest loss was in motor vehicle accessories and parts made of aluminum, which decreased 28 per cent to \$11,719,444 from \$16,272,132 in 1927. Production in 1929 of aluminum motor vehicle accessories and parts totaled 25,877,354 lb., showing an average of 45½ c. a lb.

General Electric To Build \$1,000,000 Plant

A new manufacturing building to cost \$1,000,000 is to be erected at the Pittsfield plant of the General Electric Co. Devoted exclusively to the manufacture of transformer tanks, it will be one of the largest shops of its kind, more than 150 x 550 ft. and 70 ft. high. It is to be of all welded construction. Plans provide that the entire building shall be of steel and glass on a concrete foundation, with no brick or timber used. More than 1500 tons of structural steel and 32,000 panes of glass, set in steel sash, will be required. Welded steel pilasters will be used instead of the usual brick. The roof will be a welded blanket of insulated steel, covered with a waterproof compound.

Connected with the main building will be an extension, 27 x 350 ft., to be used for manufacturing and production offices. It is expected the new building will be adequate to care for large transformer needs until 1935.

PERSONALS

HERBERT E. FIELD, heretofore vice-president of the recently formed Continental Roll & Steel Foundry Co., has resigned that position to become manager of roll sales for the Mesta Machine Co., Pittsburgh. After graduation from college, Mr. Field became associated with the Builders' Iron Foundry, Providence, R. I., and later was connected with the Farrell Foundry



Herbert E. Field

dry & Machine Co., Ansonia, Conn. He was with the Mackintosh-Hemphill Co., Pittsburgh, for 10 years and left that company to become president of the Wheeling Mold & Foundry Co., Wheeling, W. Va., which position he had occupied for the past 15 years. When this company was merged with the Continental Roll & Steel Foundry Co., he was elected vice-president.

WHARTON CLAY, who has been commissioner since 1920 of the Associated Metal Lath Manufacturers, Chicago, has become identified with the general offices of the Truscon Steel Co., Youngstown.

H. GLEN HEEDY has resigned as assistant to C. S. ROBINSON, vice-president of the Youngstown Sheet & Tube Co. in charge of raw materials, to become associated with Pickands, Mather & Co., Cleveland.

ROY C. MCKENNA, president, Vanadium-Alloys Steel Co., Latrobe, Pa., with Mrs. McKenna, sailed last week for a vacation in Europe.

ADOLPH A. WAGNER, treasurer, A. F. Wagner Architectural Iron Co.,

Milwaukee, has been elected also vice-president and general manager, taking over duties of WILLIAM F. EICHFELD, who resigned to establish a new structural and ornamental iron works with his son, W. KENNETH EICHFELD, as William F. Eichfeld & Son Co. Mr. Wagner is the son of the founder and president of the Wagner company, ADOLPH F. WAGNER.

WARREN MAXWELL has been appointed superintendent of the Dodge works of the Link-Belt Co., succeeding the late F. J. Oakes. Mr. Maxwell was born in Rockville, Ind., and received his schooling at Wabash College, Marion Military Academy and the United States Naval Academy. He entered the sales department of the Link-Belt Co. in 1922. In January, 1929, he was made assistant superintendent, from which position he has just been promoted.

S. HILLMAN, president and general manager, Rockford Screw Products Co., Rockford, Ill., addressed members of the American Business Club at Rockford on "Preparation of Steel for Industrial Uses."

J. E. ADDICKS, Philadelphia, formerly connected with the Maryland Steel Co., which operated what is now the Sparrows Point plant of the Bethlehem Steel Co., will head the Birmingham office of the Bureau of Foreign and Domestic Commerce, effective Oct. 15. He will succeed CHARLES L. McLAIN, who will open the bureau's new office at Charleston, S. C. Mr. Addicks has been identified with the bureau since last February.

E. C. KOSTER, who was vice-president and factory manager of the Vlcek Tool Co., Cleveland, has been made executive vice-president. J. C. WATTLEWORTH, assistant factory manager, has become factory manager. F. S. MACOUREK, who was secretary and treasurer of the company for the past 13 years, has retired, and D. B. WILSON and H. F. VLCEK have become secretary and treasurer respectively.

CLIFFORD S. STILWELL has been appointed sales manager of the Warner & Swasey Co., with headquarters at the home office in Cleveland. Mr. Stilwell has been associated with this company since his graduation from Denison University in 1912, when he began as special apprentice in the works at Cleveland. Following two years as representative in the Chicago and Detroit offices, he was made district manager in Detroit in 1915. He assumed his new duties on Oct. 1.

B. F. MERCER, general superintendent of the Union Steel Casting Co., Pittsburgh, has been elected vice-president. He has been identified with the Union organization for the past 18 years.

CHARLES C. PLUMMER, formerly Chicago district manager for the R. H. Beaumont Co., Philadelphia,



Clifford S. Stilwell

has been appointed manager of the Chicago office of the Bigelow-Liptak Corp., Detroit, manufacturer of suspended furnace walls and arches. W. D. DREISKE, of the Chicago office, has been transferred to Detroit.

W. R. CUNNICK, who has been Detroit district manager for the Weirton Steel Co., Weirton, W. Va., has been appointed general manager of sales of the company's strip steel and strip steel sheet division, with headquarters at Weirton. L. T. LOTT, who has been assistant sales manager of the strip division, continues in that capacity. A. C. CHILDS, who has been assistant Detroit district manager for the Weirton company, succeeds Mr. Cunnick as district manager in that city. H. A. HOLMES, formerly with the Detroit sales organization of the Seneca Iron & Steel Co., Buffalo, and W. H. DAVIS, who has been in the Detroit office of the Sharon Steel Hoop Co., are now associated with the Weirton company at Detroit.

C. S. POWERS has been appointed district manager of a new sales office the Republic Steel Corp. has opened at Tulsa, Okla. Mr. Powers was connected with the Republic sales office

at Detroit. The Tulsa district will include Oklahoma and a portion of Kansas.

W. S. HANFORD, of San Francisco, has been appointed northern California representative for the Worth Steel Co., Claymont, Del. Mr. Hanford has been identified with the iron and steel trade in California for many years. He was formerly with Jones & Laughlin Steel Corp., and at one time was representative for the Interstate Iron & Steel Co.

RAY H. MORRIS, for the past three years Rochester, N. Y., district manager for Brace-Mueller-Huntley, Inc., has resigned that position to join the sales staff of the Davenport Machine Tool Co., Inc., Rochester, N. Y. For the present, Mr. Morris' territory will include New York State, southern New England and northern New Jersey.

J. W. FEISS, who has recently returned from N'Changa, Northern Rhodesia, has become associated with the mining engineering department of Crowell & Murray, Inc., Cleveland. Mr. Feiss, who is a graduate of the Arizona School of Mines, has been for some time associated with the Rhodesian Congo Border Concessions as geologist.

GEORGE L. KELLEY, metallurgist, Budd Mfg. Co., Philadelphia, was the speaker at the regular October meet-

ing of the New Jersey chapter of the American Society for Steel Treating, Oct. 7, at the Berwick Hotel, Newark. His subject was "Automotive Steels."

C. A. THAYER has been appointed chief engineer of the Republic Steel Corp., with headquarters at Youngstown. He was chief engineer of the Gary works, Illinois Steel Co., from 1920 until early this year. Recently he has been connected with Arthur G. McKee & Co., Cleveland, as chief engineer for that company's project for building a steel plant in Russia.

JOHN B. DE WOLF has been appointed district sales manager in Philadelphia for the Republic Steel Corp., succeeding CHARLES F. McKINLEY, who has held that position for many years. S. M. TRUITT, who was assistant manager of sales in Philadelphia and formerly Philadelphia sales manager for the Central Alloy Steel Corp., also has left the Republic organization. Mr. De Wolf has recently been assistant manager of the tin plate division of the Republic corporation, and before that was Philadelphia district sales manager for the Trumbull Steel Co.

A. A. KINNEY, formerly assistant manager of the Des Moines, Iowa, office of the Bureau of Foreign and Domestic Commerce, has been placed in charge of the office opened this week at Salt Lake City, Utah, by the bureau.

JAMES H. REED, JR., president of the American Die & Forge Co., Swissvale, Pa., died suddenly on Oct. 4 in New York, while on a business trip. He was 46 years of age and a graduate of Princeton University, class of 1904.

Organization Formed To Watch Russian Imports

J. Carson Adkerson, president, American Manganese Producers' Association, was made chairman of a temporary cooperative committee known as the Joint Conference on Unfair Russian Competition, organized at a meeting last week in New York. The organization represents an alliance of American industries and labor groups which claim to have been injured by so-called unfair imports from Russia under the five-year industrialization plan.

The organization, according to an announcement, will serve as a clearing house for information concerning Russian competition. It also will endeavor to obtain cooperation of public authorities, it was stated, in the adoption and enforcement of policies for protection against Russian competition.

C. M. Schwab to Dedicate New Lehigh Laboratory

Charles M. Schwab will deliver the dedicatory address at the official opening of the James Ward Packard Laboratory of Electrical and Mechanical Engineering, at Lehigh University, Bethlehem, Pa., on Oct. 15.

The dedicatory exercises will last for three days, and among the speakers will be F. A. Merrick, president, Westinghouse Electric & Mfg. Co., East Pittsburgh; William Butterworth, president, United States Chamber of Commerce; L. W. Baldwin, president, Missouri Pacific Railway; A. R. Glancy, president, Oakland Motor Car Co.; M. S. Sloan, president, Brooklyn Edison Co.; Bancroft Gherardi, vice-president and chief engineer, American Telephone & Telegraph Co.; Magnus W. Alexander, president, National Industrial Conference Board; Edward A. Filene, Boston merchant; Dr. John Johnston, director of research, United States Steel Corp., and S. L. Andrew, chief statistician, American Telephone & Telegraph Co.

Republic Steel Corporation has placed an order with H. A. Brassert & Co., Chicago, for a 40,000 cu. ft. Brassert disintegrator and eliminator and one high efficiency hot blast stove lining for its plant at Warren, Ohio. Illinois Steel Co. has ordered two additional disintegrators for the Gary plant.

▲ ▲ ▲ OBITUARY ▲ ▲ ▲

S. H. WIGHTMAN, vice-president, Portland Concrete Machines Co., Chicago, died Oct. 2. He had been operated on recently for appendicitis and was believed to be on the road to recovery.

J. WILL JOHNSON, vice-president, Pyle National Co., Chicago, manufacturer of locomotive headlights, died Oct. 2 at an Elgin, Ill., hospital, from injuries received in an automobile accident near Crystal Lake, Ill.

RICHARD H. LIPPINCOTT, formerly a member of the firm of Dickerson, Van Dusen & Co., New York, sheet metal jobbers, died at his home in New York, Oct. 4, aged 82 years. He entered the employ of the company in 1875 and became a firm member in 1899, continuing with the company until his retirement last year.

EDWARD R. CULVER, SR., vice-president, Wrought Iron Range Co., St. Louis, vice-president of the Southern Malleable Iron Co., East St. Louis, Ill., and president of the board of trustees of Culver Military Academy, Culver, Ind., died of heart disease on Oct. 2 at his summer cottage on Lake

Maxinkuckee, near the academy. He was 58 years old.

JOHN C. REED, for a number of years identified with the Standard Sanitary Mfg. Co., Pittsburgh, died at his home in that city on Oct. 1. He was born in Ireland in 1847 and came to this country when he was two years old. He founded a jobbing and stove foundry in the Pittsburgh district in 1883, but 10 years later entered the employ of the Standard company, where he held many positions, finally rising to general superintendent of foundries. He was also a member of the board of directors for a number of years.

HENRY LINDAHL, president, Lindahl Foundry & Machine Co., Chicago, died of heart disease on Oct. 2, aged 71 years. He was a native of Sweden, and had lived in Chicago since 1880.

RICHARD H. EDMONDS, founder and editor of the *Manufacturers' Record* died at his home in Baltimore on Oct. 4, aged 73 years. He had been editor since 1882 and was known as an ardent champion of the South's industrial resources.

Machine Tool Buying Shows No Sustained Improvement

Orders Are
Scarce But Buyers
Take Less Time For Decisions

BUYING of machine tools fails to show substantial improvement. At Chicago, September was the low month of the year for some sellers, but a leading New York agency reports that its total volume last month ran 20 per cent ahead of that for August.

It is not expected that the re-

mainder of the year will develop more than a slight upward trend. Some in the trade do not look for a major recovery before spring.

Production schedules in leading machine tool plants are being held at a low level, and some further curtailment has occurred in some districts.

Orders are very light from the rail-

roads and the automobile industry, while miscellaneous industrials are buying only single machines, mostly for special production work.

The only marked sign of improvement is that buyers are closing orders with little delay, indicating perhaps that they do not inquire for a machine until they feel an urgent need for it.

New York

Machine tool buying made no further progress during the past week, and, in fact, orders for some of the New York sales offices were in smaller volume than those of the week before. While inquiries are being acted upon more quickly than in recent months, the buying is mostly of single machines for special production work. Expectations do not run high as to the volume of business that may be expected during the remainder of the year, and general opinion is that no important recovery will be in evidence before spring. One large machine tool seller reports that its September sales ran 20 per cent ahead of those in August, but the latter month was its poorest since 1921.

Chicago

Orders which machine tool dealers had expected to materialize the past week did not reach their books, with the result that purchases in September were at or near the low point of the year. An encouraging note comes from visits to local machine shops. Contract work is gradually gaining headway, especially among the smaller shops which are equipped to produce small and frequently ordered lots.

The Illinois Steel Co. has placed an order against an old inquiry, and the Chicago Board of Education is buying against its several lists. The Santa Fe is asking for figures on a crank-pin turning machine and several railroads are requesting approximate prices, presumably for budget purposes.

Cleveland

Machine tool sales and inquiry were light the past week. Orders were confined to a few single machines from

scattered sources, the demand not showing any particular life from any industry. There are no inquiries of any size from industrial plants. The railroads remain out of the market, and little business is being placed by the motor car industry. The Cleveland Board of Education will receive bids Oct. 20 for four 14-in. x 6-ft. lathes. Bids were previously asked but were rejected.

Milwaukee

If the relatively excellent run of business booked during the first days of October is sustained, the month probably will go on record as one of the best 30-day periods of the year. The progress in September from the low point reached in August not only is being continued, but is increasing. A bright spot is the renewed interest of automobile manufacturers, especially in the Detroit area. Compared with the summer period, business is satisfactory. A significant development is the more active buying of cutters and reamers by small tool manufacturers, and more frequent orders from railroads. Replacement buying is still the major factor.

New England

The general feeling is that machine tool business will be decidedly better in November. Quite a number of prospects are preparing to place orders in December provided they can secure January datings on bills. New England machine tool dealers are securing more inquiries from other sections of the country and from abroad, but buyers apparently are in no hurry to cover their requirements. Used tool sales are confined to an occasional tool room lathe and to bench equipment.

Sales of small tools are holding up well and are running ahead of those for September. Makers have well assorted stocks and are making prompt shipments.

Cincinnati

Except for occasional new orders, September showed no improvement in machine tool bookings in this district. In fact, manufacturers increased efforts to curtail production schedules and factory forces wherever possible. Business the past week consisted of single tools from widely distributed points, with a slight increase in orders for radial drills.

Manufacturers have checked back on the previous quotations and find that buyers are still interested, but are awaiting the trend of general business before making outlays for new equipment. With demand slow and inquiry about the same, production is being held at a low level.

Pittsburgh

Although considerable inquiry for machine tools is still coming out, buying is still rather disappointing and September business was not up to the expectations of most dealers in this territory. The failure of general business to show substantial improvement during the month has helped to sustain the cautious attitude of the smaller companies, while the larger interests are not buying heavily.

No industrial lists of importance are before the trade, although dealers are figuring extensively on special equipment and developing some prospective business which may lead to desirable orders. Steel mills in the Pittsburgh and Valley districts are doing considerable work in plant improvement and are the most active buyers. The crane

market is quiet although several items are in prospect before the end of the year.

New York

PLANS have been approved by General Electric Co., Schenectady, N. Y., for addition to plant at Pittsfield, Mass., 150 x 550 ft., 70 ft. high, for production of transformer tanks, to cost about \$1,000,000. Company engineering department is in charge.

State Department of Correction, Albany, N. Y., will soon call for bids for one-story industrial shop, storage and distributing plant at State institution for mental defectives at Napanoch, to cost over \$50,000 with equipment.

Sanitation Commission, Municipal Building, New York, has secured authority for appropriation of \$17,800,000 for new sewage disposal plant on Ward's Island, consisting of dock 900 ft. long, mechanical-handling equipment, tanks and operating machinery, initial sections to cost \$7,670,000 of amount noted. L. C. L. Smith is engineer for commission.

Volmer Auto Sales, Inc., 169 Christopher Street, New York, representative for Ford automobile, has leased two-story building, 70 x 120 ft., at 97-101 Greenwich Street, and 230-38 West Twelfth Street, for new service, repair and sales building.

Greenwich Machine & Tool Co., 167 Spring Street, New York, plans rebuilding part of plant destroyed by fire Oct. 1, with loss close to \$25,000 including equipment.

J. Sarsfield Kennedy, 157 Remsen Street, Brooklyn, architect, has plans for a multi-story automobile service, repair and garage building at Pacific Street and Boerum Place to cost over \$200,000 with equipment.

International Nickel Co., 67 Wall Street, New York, has approved plans for an addition to refinery at Copper Cliff, Ont., to cost over \$500,000 with equipment. Company will transfer a unit from Port Colborne, Ont., to location noted.

Brooklyn & Queens Transit Co., 385 Flatbush Avenue, New York, has plans for a one-story car repair shop, to cost about \$70,000 with equipment.

Vacuum Oil Co., 61 Broadway, New York, has purchased Wadhams Oil Corp., Milwaukee, with refinery at East Chicago, Ind., storage and distributing plants, assets totaling \$8,000,000, and will consolidate with organization. Purchasing company contemplates expansion.

Ramapo Gas Corp., Suffern, N. Y., an interest of American Commonwealth Power Corporation, 120 Broadway, New York, has arranged for purchase of gas properties of Rockland Light & Power Corp., Nyack, N. Y. Acquired company has artificial gas plants with daily capacity of 3,882,000 cu. ft. Ramapo company is planning expansion including construction of high-pressure gas transmission pipe lines to link up gas generating stations at Suffern, Haverstraw and Nyack.

Village Council, Scarsdale, N. Y., is planning construction of electric-operated pumping station for municipal

waterworks, to cost over \$30,000 with machinery.

Board of Education, Lyndhurst, N. J., plans installation of manual training equipment in new junior high school to cost about \$750,000. Special election has been called on Oct. 21 to vote bonds in amount noted. Guilbert & Betelle, 20 Branford Place, Newark, are architects.

Exact Tool & Level Co., High Bridge, N. J., has acquired adjoining property and plans one-story addition to cost about \$30,000.

Stirrup Mfg. Co., 397 Market Street, Newark, manufacturer of metal ice cream freezers and other metal products, has leased one-story plant at 250 South Street, totaling about 18,000 sq. ft. floor space, and will remodel for new and larger plant.

John G. Helmers, 145 Summit Avenue, Union City, N. J., architect, has plans for two-story automobile service, repair and garage building, to cost about \$130,000 with equipment.

Board of Education, Matawan, N. J., is considering installation of manual training department in high school on Broad Street.

Buffalo

PLANS are under way by State Department of Public Works, Albany, N. Y., for new machine shop and mechanical trades building at State prison, Auburn, to cost about \$400,000 with equipment; also for a power plant to

INDUSTRIAL ACTIVITY

Prospects Revealed by a Survey of Construction Projects

WHILE the total value of construction projects requiring machinery and other equipment reaches a total of only \$68,000,000 this week, comparing with a total of \$86,000,000 a week ago, industrial construction accounts for \$22,500,000 against \$12,000,000 a week ago. Of this week's total, close to \$44,000,000 is represented by bond issues of public utilities, the greater part of which will be used for expansion of facilities.

In addition to industrial construction projects, distributed over 21 states, vocational and scientific school construction reaches a total of almost \$4,000,000, including technical schools at Nashville and Murfreesboro, Tenn., a \$150,000 aeronautical engineering building at Fairbanks, Alaska, a \$450,000 vocational school at Long Beach, Cal., and \$450,000 for a prison machine shop at Auburn, N. Y.

Expenditures by the oil industry show an advance, reaching \$2,500,000, which includes an oil storage and distribution plant for the Gulf Refining Co. at Cincinnati, and a \$350,000 oil refinery for the Texas Pacific Coal & Oil Co., at Temple, Tex. Upward of \$1,000,000 worth of construction projects for public utilities, in addition to bond issues for future building, includes municipal electric light plants in Minnesota and Missouri and a \$350,000 generating plant at Tuco, Tex.

Among the large industrial enterprises are a \$15,000,000 glass manufacturing plant to be built at Marysville, Mich., by the Pittsburgh Plate Glass Co., a \$1,500,000 cement plant at Vicksburg, Miss., and a \$300,000 machinery display and storage building in Oakland, Cal. Railroad construction includes a \$400,000 grain elevator at Erie, Pa., for the Pennsylvania Railroad.

cost \$450,000 with machinery. Thomas F. Farrell is chief engineer of department.

Eastman Kodak Co., Kodak Park, Rochester, N. Y., has authorized installation of paper-making department at local works for production of stocks for covering and packing films, plates and other products, to cost over \$200,000 with machinery. Contract has been let for main paper-making machine and other equipment orders will be placed soon.

Monarch Steel Products, Inc., Lackawanna, N. Y., recently organized by Edmiston Hagmeur, 32 Jones Street, Buffalo, and associates, plans operation of local factory for manufacture of steel specialties and other metal products. William D. Hassett, 119 Oxford Avenue, Buffalo, is interested in new company.

Eberl Iron Works, 128 Sycamore Street, Buffalo, has taken out a permit for one-story addition, 30 x 148 ft., for storage and distribution.

W. A. Case & Son Mfg. Co., 220 Delaware Avenue, Buffalo, manufacturer of sanitary ware, will soon begin superstructure for an addition, to cost over \$65,000 with equipment.

Price Awnlok Corporation, 51 Chandler Street, Buffalo, manufacturer of raising and lowering devices and equipment for awnings, iron frames, etc., is planning establishment of new plant at Niagara Falls, N. Y. Company will also operate plant at Niagara Falls, Ont.

Louis B. Harvey, 1451 Niagara Street, Buffalo, and associates have organized Louis B. Harvey Co., with capital of \$20,000, and plan operation of local factory for manufacture of electrical machine specialties and parts. Reuben W. Wright, Wright Apartments, Dunkirk, N. Y., is interested in new company.

South Atlantic

PLANS have been approved by Standard Oil Co. of New Jersey, Baltimore, headquarters at 26 Broadway, New York, for power plant at local oil storage and distributing works, 50 x 72 ft., to cost about \$40,000 with equipment.

Blue Ridge Lime & Stone Corporation, Ashford, N. C., is considering extensions and improvements in plant, including installation of material-handling and other equipment. Company has recently disposed of bond issue totaling about \$400,000, part of fund to be used for such purpose.

General Purchasing Officer, Panama Canal, Washington, will receive bids until Oct. 14 for 150 sets of pipe dies, 576 steel drills, pipe cutters, expansion bits, augers and other tools.

Bald Knob Furniture Co., Rocky Mount, Va., has work under way on expansion to provide about 180,000 sq. ft. additional floor space, to cost over \$400,000 with machinery.

West Brothers Sheet Metal Works, Atlanta, Ga., recently organized, has succeeded to plant and business of Atlanta Blow Pipe Co., 293 Marietta Street, and will expand operations for production of blow pipe, sheet metal products, ventilating equipment, etc. New organization is headed by E. C. and Fred G. West, and J. Hoyt.

Plant Food Co., Charlotte, N. C., recently organized with capital of \$50,000 by A. B. Conklin, 1606 Euclid Avenue, and associates, has leased local site for erection of new plant for manufacture of commercial fertilizers, to cost about \$40,000 with machinery.

Board of Education, Thomasville, Ga., is considering installation of manual training equipment in new two-story and basement high school to cost about \$125,000, for which plans will be drawn by Lockwood & Poundstone, Marietta Building, Atlanta, Ga., architects.

Engineers Public Service Co., Richmond, Va., operating electric light and power utilities, has arranged for a preferred stock issue to total about \$7,500,000, part of proceeds to be used for extensions and improvements. Company is operated under direction of Stone & Webster, Inc., 49 Federal Street, Boston.

Victor Cotton Oil Co., Gaffney, S. C., has plans for a two-story addition, 60 x 100 ft., for storage and distribution, to cost about \$20,000. M. R. Marsh, Builders' Building, Charlotte, N. C., is architect.

State Highway Department, Columbia, S. C., will soon begin erection of group of equipment maintenance and repair shops for service in Calhoun, Georgetown, Clarendon, Saluda and other counties, to cost over \$50,000 with equipment.

Carolina Gravel Corporation, Hagood, S. C., recently organized by G. E. Walker, Hagood, and associates, is planning erection of new sand and gravel plant, including installation of mining, conveying, loading and other equipment. Company is also planning development of similar properties at Horatio, S. C.

Philadelphia

CONTRACT has been let by Pennsylvania Railroad Co., Philadelphia, to United Engineers & Constructors, Inc., 112 North Broad Street, for locomotive repair shop on Market Street, to cost about \$50,000 with equipment.

F. H. Costenoble, 4933 Chestnut Street, Philadelphia, and associates have organized General Toy & Mfg. Co. to operate a local plant for manufacture of mechanical and other toys and novelties. Max Chivian, 5920 Chestnut Street, is interested in new company.

John Crompton Adelpia Corporation, 145 West Columbia Avenue, Philadelphia, manufacturer of paper boxes and containers, has asked bids on general contract for an addition to cost over \$40,000 with equipment. J. Fletcher Street, 1120 Locust Street, is architect.

Commissioner of Institutions and Agencies, State Office Building, Trenton, N. J., is asking bids until Oct. 14 for insulating materials for power plant at institution at Woodbine, N. J.; also for ash-handling and storage equipment for same power station. Charles N. Leatham, Jr., address noted, Division of Architecture and Construction, is architect.

Alfred G. Eden, Harrisburg, Pa., member of committee representing bondholders of Harrisburg Mfg. & Boiler Co., Harrisburg, has secured permission from County Court to purchase plant and equipment of company, assuming \$200,000 in bonds outstanding and defraying \$25,000 additional. It is proposed to reorganize company and resume production soon. Other members of committee representing bondholders who will be active in reorganization are George W. Reilly, Charles J. Dunkle and Andrew S. S. Patterson.

Delaware School Foundation, du Pont Building, Wilmington, Del., is considering installation of manual training equipment in addition to high school at Greenwood, Del., to cost over \$200,000. Guilbert

& Betelle, 20 Branford Place, Newark, N. J., are architects.

Sneed & Anderson Mfg. Co., Lancaster, Pa., has been organized by William F. Sneed, Lancaster, and Edward H. Anderson, Philadelphia, to operate a local plant for manufacture of metal goods and devices, also electrical specialties.

Ovens, power equipment, conveying and other machinery will be installed in new baking plant, 130 x 185 ft., to be erected at Harrisburg, Pa., by Stroehman Brothers Co., Norristown, Pa., to cost over \$80,000 with machinery.

New England

CONTRACT has been let by Simonds Saw & Steel Co., Fitchburg, Mass., to Austin Co., Cleveland, for new plant on site recently acquired, with main one-story works, 360 x 560 ft., and smaller units, to cost about \$1,500,000 with equipment. Company will consolidate two Fitchburg plants and Chicago works at new location. John O. DeWolf, 45 Bromfield Street, Boston, is engineer.

American Brass Co., Waterbury, Conn., has approved plans for an addition to branch plant at Toronto, for manufacture of seamless tubing, one-story, to cost over \$100,000 with equipment. Toronto works is operated in name of Anaconda American Brass, Ltd.

Connecticut Bearings Co., New Haven, Conn., automobile bearings, will install a service and mechanical shop in new building to be erected at 59 Goffe Street, 40 x 60 ft., with one-story extension, 20 x 55 ft., to cost over \$40,000 with equipment. Frank Elwood Brown, New Haven, is architect.

Wilmington Packing Co., Wilmington, Mass., is planning to rebuild part of dehydrating and packing plant recently destroyed by fire, with loss over \$100,000 including equipment.

Haley-Cate-Rockwood Machine Co., Everett, Mass., has been organized with capital of \$50,000 to take over and expand local plant and business of Haley-Cate-Rockwood Co., manufacturer of automobile equipment, machinery and parts. Arthur E. Haley is president of new organization.

United Airports of Connecticut, Inc., Hartford, Conn., a subsidiary of United Aircraft & Transport Co., New York, has awarded general contract to Bartlett-Brainard Co., 252 Asylum Street, for two hangars with repair facilities, etc., at air field at East Hartford, to cost about \$150,000 with equipment. Austin Co., New York, is architect and engineer.

J. A. Hill, 90 Pond Street, Natick, Mass., has asked bids on general contract for a one-story artificial ice-manufacturing plant, to cost about \$70,000 with machinery. C. Charles Coneby, 1580 Ansel Road, Cleveland, is engineer.

Union Light & Power Co., Franklin, Mass., is arranging for a stock issue of \$230,000, part of fund to be used for extensions and improvements.

Worthington Pump & Machinery Corp., 2 Park Avenue, New York, has acquired Gilman Mfg. Co., East Boston, and will manufacture Gilman line of rock drilling equipment which supplements Worthington air compressors.

Pneumatic Drop Hammer Co., Boston, has shipped four 300-lb. hammers to company at Attleboro, Mass., and two 350-lb. hammers to a Connecticut firm. Company past week booked orders for two more 300-lb. hammers for shipment

to Attleboro, and one 150-lb. hammer for a Cincinnati firm.

City of Melrose, Mass., has closed bids on a coal pocket, for which handling equipment is required.

Knox & Morse Co., 70 Freeport Street, Boston, has plans for a three-story factory, half of which will be occupied by Frank O. Gould, screw machine products. Former plant was destroyed by fire.

J. D. Crosby Co., Pawtucket, R. I., steel mill, has filed plans for a one-story addition, 60 x 115 ft., to cost \$20,000 without equipment.

Chicago

GENERAL contract has been let by Nehring Electrical Works, Inc., De Kalb, Ill., manufacturer of electrical equipment, parts, etc., to B. J. Nelson, Sycamore, Ill., for one-story addition, 236 x 360 ft., with part of unit 137 x 155 ft., to cost over \$100,000 with equipment.

Kroll Brothers, 17 North State Street, Chicago, manufacturer of juvenile vehicles, parts, etc., has leased six-story building, 50 x 125 ft., on South Michigan Avenue for new plant.

John Deere Plow Co., Moline, Ill., has taken bids on general contract for a three-story and basement factory branch and distributing plant for agricultural implements at Sloux City, Iowa, 70 x 150 ft., with L-extension, 70 x 140 ft., to cost about \$100,000 with equipment. C. A. Eckerman, Moline, is architect; Max Sklosky, Moline, is mechanical engineer.

Berst-Forster-Dixfield Co., Cloquet, Minn., manufacturer of wood novelties, etc., has plans for a one-story and basement power plant, to cost over \$35,000 with equipment. Homer F. Hallock, Oswego, N. Y., is architect and engineer. Headquarters are in Grand Central Terminal Building, New York.

City Council, Thief River Falls, Minn., is planning erection of municipal electric light and power plant to cost about \$80,000, in which amount bonds have been approved.

Minneapolis Gas Light Co., Minneapolis, operating artificial gas properties, has arranged for a bond issue of \$9,000,000, part of fund to be used for extensions and improvements.

Goy-George Motor Co., 4301 West North Avenue, Chicago, local representative for Ford automobile, has awarded general contract to Patterson & Hartrich, 140 South Dearborn Street, for two-story service, repair and sales building, 100 x 175 ft., to cost close to \$100,000 with equipment.

Bureau of Reclamation, Denver, will receive bids until Oct. 31 for one electric-operated pumping unit with capacity of 180 sec.-ft., and for one 800-hp. motor, with control and auxiliary equipment, for Minidoka project, Idaho.

State Department of Institutions, Capitol Building, St. Paul, Minn., is planning extensions and improvements in power plant at State school for deaf, Faribault, to cost about \$60,000 with equipment. Pillsbury Engineering Co., 2344 Nicollet Avenue, Minneapolis, Minn., is mechanical engineer; H. W. Austin, State Capitol, is commissioner of purchases.

Super-Power Co. of Illinois, Powerton, affiliated with Commonwealth Edison Co., 72 West Adams Street, Chicago, has disposed of bond issue of \$10,000,000, part of proceeds to be used for expansion. Company has work under way on

addition to steam-operated electric generating station with ultimate capacity of 320,000 kw. A steel tower transmission line will be built from Powerton to Chicago. Company engineering department is in charge.

Reorganization of Heggie-Simplex Boiler Co., Joliet, Ill., was announced recently when company purchased Joliet Bridge & Iron Co., which will be added to its manufacturing capacity. James G. Heggie is president; Charles A. Russell, secretary-treasurer, and William A. Nevin, general sales manager.

A new road machinery assembly plant, 40 x 60 x 205 ft., to cost \$20,000, is being erected by Iowa Mfg. Co., 924 Sixteenth Street, Cedar Rapids.

Ideal School Supply Co., 8316 Birkhoff Avenue, Chicago, has placed contract with Austin Co. for a one-story wood-working plant, 60 x 120 ft.

Detroit

TRACT of 325 acres has been acquired at Marysville, Mich., by Pittsburgh Plate Glass Co., Pittsburgh, as site for new plant for production of sheet glass products for automobiles, including machine shop, power house and other mechanical buildings to cost over \$15,000,000 with machinery.

Interests identified with Hugh Lyons & Co., Lansing, manufacturers of store fixtures and equipment, commercial automobile bodies, metal stampings, etc., headed by Homer D. Luce, vice-president, have organized Luce Mfg. Co., with capital of \$200,000, to take over and expand automobile body and metal stamping business of first-noted company. Mr. Luce will be president of new company.

Holland Furnace Co., Holland, has approved plans for a three-story addition, 40 x 200 ft., to cost close to \$185,000 with equipment.

Stanley W. McFarland, Port Huron, and associates have organized Midland Wire Co., Twenty-fifth and Moak Streets, with capital of \$100,000, to operate a local mill for manufacture of wire products. Arthur A. Mueller, Sycamore, Ill., is one of heads of new company.

American States Public Service Co., operating Edison Sault Electric Co., Sault Ste. Marie, Mich., and other electric light and power utilities, has arranged for a bond issue of \$2,130,000, part of proceeds to be used for extensions and improvements.

Arco Electrical Corporation, 1727 Sedgwick Street, Chicago, manufacturer of electric transformers, choke coils, power accessories, etc., has removed its plant to Niles, Mich., where it will occupy building totaling about 25,000 sq. ft. floor space. Expansion will be carried out at new location, including installation of additional equipment, latter to cost close to \$20,000. Headquarters of company will continue at Fort Wayne, Ind.

Carroll Steel Foundry Co., Houghton, will be reorganized with capital of \$250,000, headed by James R. and Richard Carroll. Plans are under way for rebuilding foundry and plant destroyed by fire several months ago, to cost over \$70,000 with equipment.

Ex-Cell-O Aircraft & Tool Corp. has awarded contract to Austin Co. for a new unit for Continental Tool Division at 5835 Martin Avenue, one story, 53 x 190 ft., to cost about \$150,000.

U. S. Tool & Mfg. Co. has awarded a contract to Austin Co. for a new plant at Dearborn, Mich., one and two stories,

100 x 200 ft., for manufacture of precision tools.

Haberkorn & Wood, 2208 West Fort Street, Detroit, have been appointed agents in Detroit territory for David Leckie Elevating Die Truck Co., Philadelphia.

Gulf States

PLANS are under way by Texas Pacific Coal & Oil Co., Thurber, Tex., for new oil refinery at Temple, Tex., to cost over \$350,000 with machinery.

Pure Ice & Cold Storage Co., Beaumont, Tex., will soon take bids for a one-story ice-manufacturing and cold storage plant at Lake Charles, La., 80 x 120 ft., to cost about \$50,000 with machinery.

Orleans Parish School Board, City Hall Annex, New Orleans, will install manual training equipment in new three-story Palmer school, for which bids have been asked on general contract, to cost over \$200,000. E. A. Christy, address noted, is supervising architect for school board.

Texas Utilities Co., Plainview, Tex., will build a new steam-operated electric generating plant at Tuco, Tex., initial unit to use either gas or oil as fuel, to cost over \$450,000 with equipment. A transmission line will be built for connection with present system, as well as with lines of Southwestern Public Service Co., Amarillo, Tex. Company is operated by American Commonwealths Power Corporation, 120 Broadway, New York.

Leroy Frank, Clearwater, Fla., is at head of project to establish local mill for manufacture of commercial fertilizer, to cost over \$50,000 with equipment. A company will be organized, capitalized at about \$100,000.

Commanding Officer, United States Army, Duncan Field, San Antonio, Tex., will soon take bids for a depot mechanical and operating shop to cost close to \$400,000 with equipment; also for hangar units to cost about \$100,000.

City Commission, Denton, Tex., has plans for a one-story municipal electric-operated ice-manufacturing plant, to cost about \$50,000 with machinery.

Yazoo Portland Cement Co., Vicksburg, Miss., care of Ralph T. Miller, Nashville, Tenn., president and general manager, recently organized, has taken options on property at Vicksburg for erection of new mill, to cost over \$1,500,000 with machinery.

Knight-Hoffman Iron & Metal Co., Montgomery, Ala., recently organized, is planning operation of a local scrap metal works. J. B. Knight, Montgomery, heads company.

Arkansas Natural Gas Co., operated by Cities Service Co., 60 Wall Street, New York, has purchased controlling interest in Louisiana Oil Refining Corp., Shreveport, La., with oil refineries at Bossier City and Gas Center, La., and will operate as a subsidiary. Expansion is being considered for natural gas service pipe lines to other points.

Honey Grove Cotton Oil Co., Honey Grove, Tex., is planning to rebuild part of mill recently destroyed by fire, with loss close to \$100,000 including equipment.

Ohio Oil Co., Findlay, Ohio, has work under way on expansion and improvements at oil refinery of Mid-Kansas Oil & Gas Co., Fort Worth, Tex., recently taken over in connection with acquisition of Transcontinental Oil Co. properties, and will install additional machinery in num-

ber of departments. Program will cost over \$75,000.

Baton Rouge Electric Co., Baton Rouge, La., has asked bids on general contract for a one-story and basement equipment service, storage and distributing plant, 85 x 150 ft., to cost about \$50,000 with equipment. Wogan & Bernard, Raymond Building, are architects.

Milwaukee

CAPITAL stock of Moise Steel Co., 454 Virginia Street, jobber of sheet steel, has been increased from \$50,000 in preferred shares to \$75,000 and 12,500 shares of no-par common stock. New issue will be used mainly for new plant and equipment. Work is under way on new shop, 75 x 225 ft.

Cohodas Brothers, Ishpeming, Mich., have placed general contract with Carl Erickson, local builder, for new cold storage plant and warehouse, 127 x 175 ft., to cost \$100,000 with refrigerating machinery, conveyors and other equipment. D. E. Anderson, Marquette, Mich., is architect.

Shell Petroleum Corp. has acquired site at LaCrosse, Wis., and is establishing bulk gasoline and oil plant, with initial investment of about \$75,000.

Bids close Oct. 14 with Leonard Christensen, village clerk, Sturtevant, Wis., for waterworks improvements costing about \$30,000, including new 75,000 or 100,000-gal. elevated steel storage tank on 125-ft. tower, and 3975 lin. ft. of 6-in. pipe. Pope & Cape, consulting engineers, 310 Fifth Street, Racine, Wis., are in charge.

Wisconsin Aluminum Foundry Co., South Sixteenth and Franklin Streets, Manitowoc, Wis., has incorporated under Wisconsin laws with authorized capitalization of \$250,000. Name is amended to Wisconsin Aluminum Foundry Co., Inc. No change in ownership or management is contemplated. Plant improvements are in early prospect.

Milwaukee Forge & Machine Co., has removed from 340 East Oklahoma Avenue to 1532 East Oklahoma Avenue, Milwaukee.

Spring City Foundry Co., Waukesha, Wis., will build an addition, 100 x 100 ft., to cost \$75,000. Frank D. Chase, Inc., Chicago, is engineer.

Pittsburgh

BIDES have been asked by Board of Education, Washington, Pa., on revised plans for new junior and senior high school with two-story vocational training shop, 75 x 125 ft., entire project to cost about \$650,000. E. B. Lee, Chamber of Commerce Building, Pittsburgh, is architect.

Pennsylvania Railroad Co., Pennsylvania Terminal, Pittsburgh, has approved plans for new grain elevator at Erie, Pa., with capacity of 1,300,000 bu., to cost about \$400,000 with elevating, conveying, screening and other equipment.

Blair Strip Steel Co., New Castle, Pa., plans rebuilding part of mill destroyed by fire Oct. 1, with loss over \$300,000 including equipment. George D. Blair, Jr., is president. Company specializes in production of pressed steel parts for automobiles, etc.

Gulf Refining Co., Frick Annex, Pittsburgh, has awarded general contract to McClintic-Marshall Co., Oliver Building,

for oil refining, storage and distributing plant and terminal facilities at Cincinnati, to cost about \$1,500,000 with equipment.

American Coal Co., 1 Broadway, New York, affiliated with William C. Atwater & Co., same address, is considering rebuilding part of coal-washing and preparing plant at mining properties at McComas, W. Va., recently destroyed by fire, with loss over \$100,000 including equipment.

J. M. Harvey, Punxsutawney, Pa., and associates have organized Melton Control Co., to operate a local plant for manufacture of electrical and mechanical devices and equipment, appliances, etc. M. T. Harvey, Punxsutawney, and J. R. Shoffner, Timblin, Pa., will be officials of new company.

Board of Trustees, Grove City College, Grove City, Pa., has plans for a new three-story science building, 80 x 200 ft., to cost about \$500,000 with equipment.

West Virginia Hydroelectric Co., a subsidiary of Union Carbide & Carbon Corp., 200 Madison Avenue, New York, has ordered two pulverized coal-fired boiler units, to be installed at Boncar, W. Va., from Combustion Engineering Corp., New York. Equipment will cost about \$500,000.

Arthur G. McKee & Co., engineers and contractors, Cleveland, have received a contract from Pennzoil Oil Co. for a Dubbs cracking unit at its refinery at Oil City, Pa. Amount involved is about \$500,000.

Cleveland

GENERAL contract has been let by Federal Machine & Welder Co., Warren, Ohio, to Warren Engineering Co., for one-story addition, 50 x 200 ft., to cost over \$100,000 with equipment.

Adamson Mfg. Co., East Palestine, Ohio, manufacturer of steel tanks and kindred products, has plans for a new one-story plant, to cost about \$45,000 with equipment.

Reserve Lithograph & Printing Co., Caxton Building, Cleveland, will install conveying machinery, air-conditioning apparatus and other equipment for special process work in new three-story and basement plant, to cost \$150,000, for which bids will soon be asked on general contract.

Cold Metal Process Co., Youngstown, Ohio, contemplates installation of additional equipment for increased output.

T. W. Beelman, Willard, Ohio, is at head of project to erect local plant for manufacture of burial vaults. Site has been secured and work will soon begin on one-story factory, to cost over \$35,000 with equipment. Mr. Beelman is identified with Beelman Lumber & Mfg. Co., operating a local mill.

International Harvester Co., Motor Truck Division, East Thirtieth Street and Chester Avenue, Cleveland, has plans for a one and two-story service, repair and sales building, to cost about \$135,000 with equipment. Headquarters are at Chicago.

Marvex, Inc., Canton, Ohio, recently organized to manufacture metal grass, under process invented by Marvin Smith, Canton, for covering miniature golf links, will start production in about 10 days in a plant of Luntz Iron & Steel Co. Material to be manufactured is about 80 per cent metal.

Cincinnati

CONTRACT has been let by Jackson Box Co., 4927 Beech Avenue, Cincinnati, manufacturer of corrugated paper boxes and containers, to Austin Co. for one-story and basement addition, to cost over \$40,000 with equipment.

In connection with discontinuance of structural steel fabricating business, General Iron Works, 1221 Front Street, Cincinnati, is planning for sale of present plant, fully equipped, and will establish factory for production of Hot-Kold heating systems and equipment, on which manufacture will be concentrated in future.

Coca-Cola Bottling Works, 1527 Church Street, Nashville, Tenn., plans installation of automatic bottling machinery, conveying and other equipment in two-story plant at Lebanon, Tenn., to cost about \$55,000. Asmus & Clark, Nashville Trust Building, Nashville, are architects.

City Council, McKenzie, Tenn., is planning extensions and improvements in municipal electric light and power plant, including additional equipment. V. V. Long & Co., Colcord Building, Oklahoma City, Okla., are consulting engineers.

State Board of Education, Nashville, Tenn., is asking bids on general contract until Nov. 6 for a two-story building at Tennessee Polytechnic Institute, Cookeville, to cost about \$225,000 with equipment; also for a new science building at State teachers' college, Murfreesboro, to cost close to like amount with equipment. R. H. Hunt, First National Bank Building, Chattanooga, Tenn., is architect for both structures.

Egry Register Co., 429 East Monument Avenue, Dayton, Ohio, manufacturer of manifold registers, parts, rollers, etc., has asked bids on general contract for a two-story addition to cost about \$35,000, primarily for storage and distribution. Edward P. Musselman, 1408 West Fifth Street, is architect.

Common Council, Covington, Tenn., is planning establishment of municipal airport with hangar, repair shop and other field units, to cost over \$35,000 with equipment.

Powell Lime & Cement Co., 2814 Broad Street, Memphis, Tenn., has purchased former plant of Raleigh Sand & Gravel Co., Cedar Road, and will remodel and install additional equipment for new plant.

National Brass Mfg. Co., 1115 Marshall Avenue, Cincinnati, has been taken over by W. C. Grueneberg and S. M. McKenzie and company name has been changed to National Metal Industries, Inc. Manufacture of builders' hardware, hollow metal, fire doors and ornamental bronze will be continued.

Fuller Lehigh Co., Fullerton, Pa., has removed Cincinnati office from Traction Building to Carew Tower. H. E. Martin is manager.

Indiana

CONTRACT has been let by Servel, Inc., Evansville, manufacturer of gas-operated electric refrigerating units, parts, etc., to M. J. Hoffman Construction Co., Furniture Building, for three-story unit, 35 x 115 ft., for sheet metal service, and one-story structure, 80 x 240 ft., for an enameling plant, to cost over \$100,000 with equipment. Company engineering department is in charge.

Chicago District Electric Generating

Corporation, Hammond, formerly known as State Line Generating Co., has disposed of a bond issue of \$15,000,000, part of fund to be used for expansion in steam-operated electric generating station near Hammond, on which preliminary work is being started.

Fries Tool & Machine Co., East Wayne Street, Fort Wayne, is considering early call for bids for one-story addition, to cost about \$45,000 with equipment, for which plans are being completed by Guy Mahurin, Standard Building, architect.

General Products Corporation, Indianapolis, recently organized, is arranging for operation of new plant at 3607 Orchard Street, for manufacture of hot air metal registers for domestic service, electric windshield wipers and kindred products. C. H. Strupe is president, and E. H. Leedy, secretary and treasurer.

Lincoln Oil & Refining Co., Morton Avenue and Illinois Street, Evansville, has plans for a one-story bulk storage and distributing plant, 50 x 100 ft., to cost about \$35,000 with equipment.

St. Louis

CONTRACT has been let by Chevrolet Motor Co., North Union Avenue and Natural Bridge, St. Louis, to A. H. Haeseler Building & Construction Co., Wainwright Building, for one-story addition to mechanical shop, including improvements in present unit, to cost about \$30,000 with equipment.

City Council, Thayer, Mo., has authorized plans for a municipal electric light and power plant, to cost over \$60,000 with equipment. W. A. Fuller Co., 2916 Shenandoah Avenue, St. Louis, is engineer.

State Board of Control, Capitol Building, Lincoln, Neb., has plans for one-story manual training building at State school for deaf, Omaha, to cost about \$50,000 with equipment. Lawrie & Stockham, Paxton Building, Omaha, are architects.

Board of Education, Hope, Ark., is considering installation of manual training equipment in new two-story high school to cost about \$125,000. Petter & McAninch, Inc., Pyramid Life Building, Little Rock, Ark., are architects.

Rockwell Chair Co., Camden, Ark., recently organized, has approved plans for a one-story factory, to cost about \$70,000 with machinery. D. F. Graves is general manager.

United Light & Power Co., Abilene, Kan., has awarded a general contract to C. F. Fossler, Abilene, for a one-story automobile service, repair and garage building, 40 x 100 ft., with repair shop, 40 x 48 ft. Murray & Clayton, Abilene, are architects.

Motors, power equipment, conveying and other machinery will be installed in new five-story and basement printing plant, 120 x 170 ft., of Chronicle Publishing Co., Twelfth Street, St. Louis, to cost \$1,500,000 with machinery. Structure will be built by Midwest Industrial Development Co., Shell Building, and occupied under lease. Bids on general contract will be asked early in November. Frank D. Chase, Inc., 720 North Michigan Boulevard, Chicago, is architect and engineer.

G. A. Roth Mfg. Co., Hastings, Neb., manufacturer of automobile equipment and accessories, is considering erection of two one-story additions, 83 x 200 ft., and 50 x 100 ft., to cost over \$75,000 with machinery.

State Highway Commission, Jefferson City, Mo., has approved plans for service, repair and garage buildings for State motor trucks and cars at Columbia, Bowling Green, Unionville, Richmond and St. Joseph. T. H. Cutler is chief engineer.

Flexwood Co., 919 North Michigan Avenue, Chicago, contemplates new plant at St. Louis for production of pliable and flexible wood veneer products, to cost over \$200,000 with machinery.

Western Land Roller Co., Hastings, Neb., manufacturer of iron rollers, etc., will erect plant addition, to cost over \$35,000 with equipment.

Pacific Coast

PLANS have been completed by Soule Steel Co., Rialto Building, San Francisco, for a one-story plant, to cost about \$45,000 with equipment. J. A. Cole, 2178 Oregon Street, Berkeley, Cal., is architect and engineer.

Edwards Novelty Co., Sunset Avenue and Third Street, Venice, Cal., manufacturer of toys, etc., is planning to rebuild part of plant recently destroyed by fire, with loss of about \$70,000 including equipment.

California Rice Growers' Association, Chico, Cal., has awarded general contract to McGillivray Construction Co., Folsom Boulevard and Sixty-fifth Street, for rice milling plant at Broderick, Cal., including elevating, conveying, loading and other equipment. C. H. Snyder, 251 Kearny Street, San Francisco, is engineer.

Board of Education, Long Beach, Cal., has authorized construction of a one-story vocational training shop, 70 x 160 ft., in connection with new Marshall High School, entire project to cost over \$450,000 with equipment. George M. Lindsey and Erwood P. Elden, Union Insurance Building, are architects.

Le Tourneau Mfg. Co., Stockton, Cal., manufacturer of road-building and earth-moving machinery and parts, has secured a 10-acre tract on Waterloo Road and plans erection of one-story plant, welded construction type, to cost close to \$50,000 with equipment. Departments will be installed for parts production and assembling.

Apex Sheet Metal Works, 933 Twelfth Avenue, Seattle, has awarded general contract to Victor Sandberg, 2330 Fourteenth Avenue, North, for one-story plant, 60 x 120 ft., to cost about \$30,000 with equipment. Samuel Baruch is head.

Board of Trustees, Alaska College, Fairbanks, Alaska, will ask bids early next year for three-story aeronautical engineering building, 54 x 84 ft., to cost about \$150,000 with equipment. N. L. Troast, Sitka, Alaska, is architect.

Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, has plans for extensions and improvements in storage and distributing plant, to cost about \$40,000 with equipment. Company engineering department is in charge.

Santa Barbara Union High School, Santa Barbara, Cal., has authorized installation of a vocational training shop in new buildings for local school group, entire project to cost over \$500,000 with equipment. W. H. Weeks, 111 Sutter Street, San Francisco, is architect.

Contractors Machinery Exchange, 1135 Fifty-seventh Avenue, Oakland, Cal., has awarded contract to Austin Co. for display and storage building, 100 x 120 ft., to cost \$300,000.

Canada

PLANT on Ritson Road, North, Oshawa, has been leased by Westman Machinery Co., Ltd., Toronto, for establishment of new works. Plans are under way for installation of equipment.

Canada Iron Foundries, Ltd., 28 Victoria Square, Montreal, has awarded general contract to W. H. Cooper, 42 James Street, North, for plant at Hamilton, Ont., 90 x 140 ft. J. W. Langston is engineer.

George Oakley & Son, Ltd., 278 Booth Avenue, Toronto, has awarded contract to P. Lyle & Sons Construction Co., Ltd., for plant addition, to cost \$33,000.

Negotiations are nearing completion between Holbrook, Merrill & Stetson, Inc., Ltd., Los Angeles, and Phoenix Oil Burners, Ltd., Vancouver, B. C., whereby latter company will manufacture Holbrook line of domestic and commercial refrigerating machinery for Canada and exportation to Orient and points within British Empire.

Cranbrook Foundry & Machine Shops, Ltd., Cranbrook, B. C., has let contract to A. T. Jones for one-story machine shop addition, 40 x 50 ft., to cost \$9,000.

Foreign

PLANS are under way by American Can Co., 230 Park Avenue, New York, for new plant at Honolulu, T. H., with storage and distributing facilities, to cost close to \$1,500,000 with machinery. Company engineering department is in charge.

Ford Motor Co., Dearborn, Mich., has broken ground for new assembling plant at Cologne, Germany, to cost about \$1,000,000 with machinery. It is understood that divisions for parts production in addition to general assembling will be provided soon.

Midi Railroad Co. (Compagnie des Chemins de Fer du Midi), Bordeaux, France, is disposing of a bond issue totaling 140,000,000 French fr. (about \$5,390,000) part of proceeds to be used for improvements, including electrification program over portion of route between Bordeaux and Montpellier, Certe and vicinity, about 2665 miles. Paul Tirard is president of board of directors.

Soviet Russian Government, Moscow, Russia, is scheduling construction of eight rubber manufacturing plants in different sections of country during coming year, as well as four other rubber works for extraction of raw material from hondrilla, a rubber-bearing plant in Russia, to represent investment of over \$10,000,000 with machinery. Amtorg Trading Corporation, 261 Fifth Avenue, New York is official buying agency.

Railway Standing Finance Committee of Government of India, Calcutta, has approved plans for extensions and improvements in locomotive repair shops at Jumalpur, Bengal, including new erecting shops with traveling cranes. New tools will be provided and other operating equipment for straight-line production. Entire project will cost about 6,700,000 rupees (about \$2,412,000). Committee has also approved a proposal to double-track line of same railroad from Cawnpore and Tundia, about 241 miles, with extensions in station yards, car facilities, etc., to cost 9,382,437 rupees (about \$3,377,687). Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference India No. 113823.

Ford Motor Buys Furnace for Scrapping Cars

The Ford Motor Co., Detroit, has ordered a 400-ton tilting open-hearth furnace from the Pennsylvania Engineering Works, New Castle, Pa., for the scrapping of old automobiles. The Ford company also awarded to the Pennsylvania Engineering Works an order for two 600-ton mixers for its steel-making department and the contract for the designing of mixers and other special equipment for the foundry department of the Ford plant now under construction at Dagenham, England.

McCrosky Tool Corp. Acquires Midwest Tool

The Midwest Tool & Mfg. Co., 2360 West Jefferson Avenue, Detroit, has been merged with McCrosky Tool Corp., Meadville, Pa. The Midwest plant in Detroit will be operated as Midwest Tool & Mfg. Co. Division of McCrosky Tool Corp. The Midwest management has been retained, and the McCrosky sales organization will give national distribution to the products of the Detroit plant, which include interchangeable counterbores, core drills, adjustable holders, inserted blade milling cutters and special cutting tools.

The home office and plant of McCrosky Tool Corp. will be maintained at Meadville.

Philadelphia Foundrymen Hold First Fall Meeting

At the fall meeting of the Philadelphia Foundrymen's Association, Inc., Wednesday evening, Oct. 8, at the Manufacturers' Club, Philadelphia, C. J. Scullin delivered an address entitled "Advancement and Progress in the Gray Iron Industry." Mr. Scullin is associated with the Mississippi Valley Research Laboratories, St. Louis, and is a native of Philadelphia and a practical foundryman.

U. S. Pipe & Foundry Co. Acquires Davies & Thomas

The Davies & Thomas Co., with foundry and machine works at Cata-sauqua, Pa., has become associated with the United States Pipe & Foundry Co., Burlington, N. J. The Davies & Thomas Co., however, will continue to operate under its own name. New officers of the company are: George Davies, 342 Madison Avenue, New York, president and treasurer; D. P. Hopkins, Burlington, N. J., vice-president; Charles R. Rauth, Burlington, N. J., secretary; F. J. Walker, Cata-sauqua, Pa., assistant secretary and assistant treasurer. The board of directors includes Mr. Davies, Mr. Hopkins and Mr. Rauth, D. B. Stokes, Burlington, N. J.; H. A. Hoffer, Phil-

adelphia, and H. V. Overholt, Pittsburgh.

For many years the Davies & Thomas Co. has specialized in cast iron tunnel segments. The company is also builder of sewage disposal machinery and by-product plant machinery, and manufactures miscellaneous gray iron and semi-steel castings. These various products the Davies & Thomas Co. will continue to make.

Armco's English Licensees to Expand Production

Geoffrey and Spencer Summers, directors of John Summers & Sons Co., Ltd., of England, arrived in New York on the Berengaria last week. Their company, the largest producers of steel sheet in Europe, is associated with the American Rolling Mill Co., of Middletown, Ohio, in the operation of a plant near Chester, England, for the production of all grades of steel sheets required in automobile construction.

After some years of cooperative effort, spent in overcoming the problems of producing proper quality under the different conditions existing on that side, the two companies have now satisfied themselves on that score, and an increase in their automobile sheet capacity large enough to meet the contemplated requirements of the British market is now under way. The visit of the Summers directors is to settle final details of construction and organization.

Blair Strip Steel Mill Damaged by Fire

Owing to a fire which last week damaged the plant at New Castle, Pa., of the Blair Strip Steel Co., causing a loss estimated at \$250,000, the Sharon Steel Hoop Co. is filling orders for the Ford Motor Co. and General Motors Corp. George H. Blair, president, states that the plant will be rebuilt at once. Sir Henry Thornton of the Canadian National Railways, is the principal stockholder in the company.

Canton Tin Plate Corp. Effects Reorganization

The Canton Tin Plate Corp., Canton, Ohio, has effected its organization by the election of W. H. Davey, president; Samuel Davey, vice-president, and W. R. Jenkins, treasurer. In addition to the officers named, the directors include E. L. Langenbach, former chairman of the United Alloy Steel Corp., and Oscar Abt. The company recently purchased the plant formerly operated by the Carnahan Sheet & Tin Plate Co. and later by the Falcon Tin Plate Co. It will manufacture tin plate and black sheet specialties.

Purchasing Agents to Meet in Pittsburgh

The sixth district of the National Association of Purchasing Agents will convene at the William Penn Hotel, Pittsburgh, on Oct. 16 and 17. Delegates from Akron, Canton, Cincinnati, Cleveland, Columbus, Dayton, Springfield and Toledo, Ohio, as well as Pittsburgh, will be in attendance. Although the final program has not been officially announced, C. G. Bunnell, purchasing agent of the Westinghouse Electric & Mfg. Co., East Pittsburgh, will lead an active discussion of purchasing problems under present business conditions.

Cincinnati Steel Market

(Concluded from page 1025)

been increased from one to two points weekly for the last five weeks.

Old Material

There has been no change in the scrap market. Dealers are buying and selling cautiously. New business is negligible. Mills continue to restrict shipments on contracts. The Louisville & Nashville and the Norfolk & Western railroads are offering their usual lists.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$11.00 to \$11.50
Scrap rails for melting....	12.00 to 12.50
Loose sheet clippings.....	7.00 to 7.50
Bundled sheets	9.50 to 10.00
Cast iron borings.....	6.50 to 7.00
Machine shop turnings....	6.00 to 6.50
No. 1 busheling.....	9.25 to 9.75
No. 2 busheling.....	6.00 to 6.50
Rails for rolling.....	13.00 to 13.50
No. 1 locomotive tires....	13.25 to 13.75
No. 2 railroad wrought....	11.00 to 11.50
Short rails	16.00 to 16.50
Cast iron carwheels.....	12.00 to 12.50
No. 1 machinery cast....	14.50 to 15.00
No. 1 railroad cast.....	12.50 to 13.00
Burnt cast	7.00 to 7.50
Stove plate	7.00 to 7.50
Brake shoes	7.00 to 7.50
Agricultural malleable ...	12.50 to 13.00
Railroad malleable	13.50 to 14.00

Warehouse Prices, f.o.b. Cincinnati

Base per Lb.	
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
New billet reinf. bars.....	3.15c.
Rail steel reinf. bars.....	3.00c.
Hoops	3.90c.
Bands	3.35c.
Cold-fin. rounds and hex.....	3.80c.
Squares	4.30c.
Black sheets (No. 24).....	4.05c.
Galvanized sheets (No. 24).....	4.90c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Structural rivets	4.20c.
Small rivets .....	.60 per cent off list
No. 9 ann'l'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg (25 kegs or more).....	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb.....	10.25
Net per 100 Ft.	
Lap-welded steel boiler tubes, 2-in. .	\$16.50
4-in.	34.50
Seamless steel boiler tubes, 2-in. .	17.50
4-in.	36.00

European Steel Prices Reach New Low Levels with Cartel Control Ended

(By Cable)

LONDON, ENGLAND, Oct. 6.

DEPRESSION continues in the iron and steel market and mills are pessimistic over the winter outlook. The pig iron market is the worst in years and only 25 Cleveland furnaces are in blast. Consumers are pressing for lower prices, but makers are firm.

Finished steel is quiet except for some export inquiry for bridge construction. Business is slow to develop, however, and mills are partially idle. Steel makers are meeting this month to discuss future prices.

Continental sellers report improved overseas demand, but business negotiated has been insufficient to satisfy the mills, and prices continue their downward trend.

Members of the Continental Steel Cartel should have met in September to renew the cartel agreement, but as no meeting was held it is assumed that the cartel control is ended, which has resulted in confusion and uncertainty.

Buying by consumers here is negligible, as large stocks are in hand and they have but little demand for their own manufactured products.

Tin plate demand has improved, and some moderate business has been executed. Consumers are seeking lower prices, although makers are unlikely to reduce the minimum further. Galvanized sheets are quiet and consum-

Failure of steel cartel to meet in September viewed as evidence of its dissolution.

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Australia prohibits galvanized sheet imports as aid to domestic industry.

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Invasion of German domestic market by Belgian steel mills brings negotiations for German-Belgian agreement.

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German tin plate becoming more of a factor in the Japanese market.

A committee appointed in 1928 to investigate the affairs of Richard Thomas & Co., Welsh tin plate makers, reports about £3,500,000 (\$17,010,000) of actual capital, while £5,910,906 (\$28,727,000) must be considered as lost. The committee does not recommend any reorganization at present. The Redbourn Hill experiments produced a saving of about £40,000 (\$194,400) and bank indebtedness of the company has been reduced by £300,000 (\$1,458,000). The directors state that the policy of reducing the bank indebtedness will be continued, and payments of preferred dividends will be further postponed, but may be resumed next year on a reduced scale if the earnings of the past year are maintained.

ers are unattracted by the lower prices being quoted.

Australia Bans Galvanized Sheets

The Australian Government is now prohibiting the importation of galvanized sheets as a means of fostering local production. Added to the Indian situation, this is a further serious blow to the British sheet industry. The Australian Association of British Manufacturers, however, is protesting against this action, stating that Australia will, as a result, be obliged to pay £670,000 (\$3,260,220) more for normal needs, while the increase in employment will not exceed 1800 persons.

Clyde launchings in September totaled 10 vessels of 27,000 tons.

Belgian Mills Threaten German Home Market

HAMBURG, GERMANY, Sept. 22.—An invasion of the German domestic steel market by Belgian sellers is imminent unless negotiations for an agreement are successful. An agreement limiting exports of France and Luxemburg is operative, and in addition control is provided in treaties of commerce with these countries. While a verbal agreement is in existence between German producers and certain Belgian mills, there are about nine important sellers in Belgium who have

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at \$4.8665 (par)

British Prices f.o.b. United Kingdom Ports

Ferromanganese, export. f11 10s.			\$55.95
Billets, open-hearth..... 5 15	to £6 5s.		27.98 to \$30.41
Black sheets, Japanese specifications..... 12 5			59.61
Tin plate, per base box.. 0 17	to 0 17½		4.13 to 4.25
Steel bars, open-hearth.. 7 15	to 8 5		1.69 to 1.79
Beams, open-hearth.... 7 7½	to 7 17½		1.60 to 1.71
Channels, open-hearth... 7 12½	to 8 12½		1.66 to 1.87
Angles, open-hearth.... 7 7½	to 7 17½		1.60 to 1.71
Black sheets, No. 24 gage 9 10	to 9 15		2.06 to 2.12
Galvanized sheets, No. 24 gage..... 11 12½			2.52

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.....	£2 12½s. to £2 13s.	\$12.66 to \$12.90
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Billets, Thomas (nominal)	3 11½	to 3 12½	17.39 to 17.64
Wire rods, low C., No. 5			
B.W.G.....	5 2½	to 5 7½	24.94 to 26.15
Rails, light.....	6 0		29.20
Black sheets, No. 31 gage, Japanese.....	11 5	to 12 12	54.68 to 58.32
			Cents a Lb.
Steel bars, merchant....	4 3	to 4 4	0.94 to 0.95
Steel bars, deformed....	4 10	to 4 11	0.99 to 1.00
Beams, Thomas, British standard (nominal)...	3 18	to 4 0	0.85 to 0.92
Channels, Thomas, American sections.....	5 12	to 5 14	1.24 to 1.26
Angles, Thomas, 4-in. and larger, over ¾-in. thick.....	3 18	to 3 19	0.85 to 0.87
Angles, Thomas, 3-in....	4 4	to 4 5	0.94 to 0.95
Hoop and strip steel over 6-in. base.....	4 15	to 4 17½	1.05 to 1.07
Wire plain, No. 8 gage..	5 17½		1.29
Wire, barbed, 4-pt. No. 12 B.W.G.....	9 15		2.11
Wire nails, base.....	5 17½		\$1.29 a keg

refused to consider any restriction on their shipments to Germany.

As an example of the competitive prices possible from Belgium, merchant bars are now offered f.o.b. German frontier at 85 to 87 m. a ton (0.92c. to 0.94c. a lb.) or, duty paid, 110 to 112 m. a ton (1.19c. to 1.21c. a lb.). German domestic prices are about 20 m. (\$4.78) a ton higher, f.o.b. works. In the case of shapes, the difference in price is about 30 m. (\$7.17), with plates, the difference is 18 to 20 m. (\$4.30 to \$4.78 a ton).

When Belgian material is quoted for shipment from Antwerp, c.i.f. Hamburg, Stettin, Lübeck or Königsberg, the difference is still greater by another 7 to 10 m. (\$1.67 to \$2.39) a ton, as the water shipment rate is much lower than the all-rail rate to Germany. Until now imports into Germany of Belgian steel have been somewhat restricted, partly by the sales comptoirs and partly by the fact that German consumers wanted prompt shipment, which the Belgians were unable to provide. However, the sales comptoirs have been abandoned, and the Belgian mills are now offering the deliveries asked by the German buyers.

Japanese Pig Iron Stocks Reach 350,000 Tons

YOKOHAMA, JAPAN, Sept. 2.—Dullness in the steel industry has brought a severe depression in pig iron, and accumulated stocks in Japan total in excess of 350,000 metric tons, with two new 300-ton furnaces at the Kamaishi mines nearing completion. The situation has been made more acute by the demand of steel makers with pig iron contracts that they be permitted to accept shipments of pig iron due in September at the end of the year. Prices are greatly depressed, and it has been suggested that Japanese producers should seek an agreement with the Indian pig iron sellers to maintain the market at a more profitable level.

Large Steel Shipments On Reparations

HAMBURG, GERMANY, Sept. 22.—In August, Germany shipped iron and steel products on reparations account to a total value of 9,500,000 m. (\$2,270,000); electrical and other machinery valued at 12,700,000 m. (\$3,035,300); railroad cars worth 5,900,000 m. (\$1,410,000), and ships valued at 2,600,000 m. (\$621,400).

European Brass and Copper Products Off

HAMBURG, GERMANY, Sept. 22.—Competition in Continental markets on copper and brass products is severe, and reductions in prices have recently been greater than the decline in the copper market. At present heavy brass sheets are being offered at £60 a ton (14½c. a lb.), copper sheets at £69 a ton (16¼c. a lb.), and the lower

grade brass sheets for the Indian market at about £47 a ton (11¼c. a lb.). Copper wire is quoted at £67 10s. a ton (16½c. a lb.), base. German mills have most of the South African copper wire business, shipping substantial quantities there for all purposes, including the manufacture of ornaments by the natives.

German Tin Plate a Factor In Japan

YOKOHAMA, JAPAN, Sept. 2.—Recently German tin plate has been appearing in the Japanese market, and is one of the few steel products able to compete with the domestic manufacture. Tin plate from Germany, England or the United States is promised a fairly good market here for the next two years or more, until Japanese production has been increased to meet the requirements. One German producer of tin plate is reported here to have recently expanded its capacity for tin plate from about 50,000 tons annually to about 150,000 tons, and is preparing to compete for the Japanese market with British and American mills. With the German product offered here in larger quantities than ever before and at competitive prices, Japanese consumers are awaiting price developments with interest.

Much Less Babbitt Is Being Used

Production of babbitt metal for sale for August was 892 net tons, against 1011 tons in July, according to reports received by the Department of Commerce from 21 concerns. Total for eight months was 11,082 tons, a sharp drop from the 18,332 tons in 1929.

Total consumption of babbitt metal, including that of companies making their own, was 1369 tons in August—the smallest amount for many months. In eight months the consumption—15,018 tons—was less than two-thirds that in the like period of 1929—23,263 tons.

To Sell Hot Mill Polisher

The Wean Engineering Co., Warren, Ohio, has acquired an exclusive license to manufacture and sell the continuous hot mill polisher invented by D. B. Geeseman, manager, Standard Tin Plate Co., a subsidiary of the Continental Can Co. This polisher has been in service in the mills of the Standard Tin Plate Co. during this year and is said to have resulted in an increase in production of 17½ per cent in a six months' test.

The polishing unit is automatic and applicable to any two-high sheet or tin mill without interference with the work of the mill crew or mechanical catchers. The licensing arrangement permits the Wean Engineering Co. to provide this equipment for the entire sheet and tin plate industry.

Continental Aluminum To Be Reduced

HAMBURG, GERMANY, Sept. 22.—It is rather generally expected that the meeting in Paris of the Bureau Internationale during the second week of October will materially reduce the price of aluminum, probably by at least 15 per cent. With the copper price at a low level, the aluminum market is decidedly high at £95 a ton (23¼c. a lb.).

Cathedral May Have Rustless Steel Dome

LONDON, ENGLAND, Sept. 16.—Sheathing with rustless steel has been recommended for the large central dome of the Roman Catholic Cathedral designed by Sir Edward Lutyens for Liverpool. The cathedral, as planned, will be the second largest Roman Catholic edifice in the world, exceeded in size only by St. Peter's in Rome.

Sharp Drop in Steel Furniture Orders

Orders for steel-furniture stock goods in the "business group" were valued at \$1,765,556 in August, against \$1,841,894 in July, according to reports received by the Department of Commerce from 34 manufacturers. The total was the smallest in many months. Orders for shelving, reported by 16 companies, were valued at \$528,770, against \$601,446.

In the first eight months, orders for steel furniture aggregated \$18,331,963, against \$23,416,212 in the like period of last year. And orders for shelving were valued at \$5,673,312, compared with \$8,210,474 a year ago.

Shipments of furniture in the business group in August were valued at \$1,966,795, against \$1,812,646 in July. In the first eight months they were \$18,883,889, against \$23,388,320 in the first eight months of 1929. Unfilled orders of this class of steel furniture on Aug. 31 were valued at \$1,331,318, against \$1,528,754 July 31.

Shipments of shelving in August were valued at \$558,797, against \$609,680 in July. In the first eight months they were \$5,609,282, against \$7,784,431 in the same period of last year.

Black & Decker Mfg. Co., Towson, Md., has established a division of its sales organization to be devoted to the marketing of high-cycle production tools, heavy-duty grinders, swing frame grinders, snaggers and buffers, under the product name of Black & Decker-Van Dorn. Curtis C. Watts has been appointed in charge of this division under the title of assistant sales manager.

Apprenticeship Committee Promotes Training Program

(Concluded from page 979)

all the screw machine time required by his indenture. It is imperative that he be removed from this department so that he may waste no time. His record shows that he must still work on the planers, turret lathes, grinders, and on the vise.

However, the foremen of these various departments stubbornly contend that for the time being they cannot take on an additional apprentice. A deadlock is reached and these foremen are summoned before the apprentice committee to discuss the matter. Confronted by this critical body, they fail to explain satisfactorily why the apprentice cannot be absorbed; they have made no determined effort to accommodate him. By means of a slight adjustment of production schedules, an arrangement is made whereby he is to begin work on a grinder on the following morning.

Again department heads and foremen sometimes fail to realize that an apprentice has graduated. It is not easy for them to understand that the young man has suddenly become an adult mechanic, that he is no longer a boy and can no longer be paid a boy's wages. A general notice over the signatures of the committee members has gone a long way to overcome this difficulty in at least two plants.

It frequently happens that after the novelty of training apprentices has passed, the interest of both boys and foremen begins to lag. The committee can overcome this difficulty to a large extent by holding contests among the apprentices in workmanship, department, class work, attendance, punctuality or other points of competition. The interest of foremen and department heads may be stimulated by carefully planned meetings for the discussion of apprenticeship questions.

Supervisor Needs Committee's Advice

The committee is invaluable to the apprentice supervisor and makes his work much easier, particularly in a machinery building plant with varied departments—engineering, pattern shop, foundries, machine shop, forge shop and maintenance. The supervisor has not had experience in all these departments and cannot fully appreciate the problems of the various trades nor the peculiar conditions that exist in departments, such as the attitude and temperament of foremen and mechanics, and the present and future need for trained men.

Therefore, the supervisor must depend upon the advice and direction of others, and it is much better for him to receive formal information from a committee member who has given thought to these matters than from some department head who is not qualified to discuss them. Moreover, committee members will support and encourage the apprentice movement much more enthusiastically than they would if they were not members, because they have been instrumental in setting up apprenticeship in the plant; it has been very much their own undertaking, and they will obviously encourage that which they have established.

The success of the apprenticeship committee depends, of course, very largely upon the members. They must be carefully selected; certain requirements for membership are essential, others are highly desirable.

Among the most important requirements of a committee member is that he shall have unquestioned authority or prestige. He must be either the head of a department or at least a man with high standing based upon experience, age, length of service, ability or judgment. He should be the type of man who has a following and whose suggestions are almost invariably adopted by others. Again, the committee member should have vision and foresight, he must not be so absorbed in the problems immediately before him that he cannot anticipate the future. He must be patient, and willing to forego present advantages for the sake of a permanent solution of a continuous problem by a deliberate, fundamental process. He should have a broad understanding of and sympathy for human nature and human problems; to him, men must be men, not merely production units. Naturally, too, the committee members should understand apprenticeship and the principles and methods of apprenticeship.

The majority of the committee members should be apprenticeship enthusiasts. However, an exception may sometimes be made in favor of an influential official who is lukewarm or even antagonistic but whose interest may be aroused by contact with the other committee members. Such men, obviously, should never constitute more than a small minority.

Direct Functions of Committee

The direct functions of the apprenticeship committee are simple and easily defined. The committee assists the supervisor in planning work and pay schedules for apprentice training. The supervisor himself may be able to write theoretically correct schedules, but these must be modified to suit local conditions. The apprenticeship committee should be responsible for the maintenance of shop conditions that are favorable to apprenticeship, especially where the interest of foremen and the attitude of apprentices are concerned.

The committee member may not have much time to devote to thinking about apprenticeship, but he is in a good position to observe results, and suggestions for improvement of training methods will undoubtedly come to his mind. The committee member will advise the apprentice supervisor regarding the hiring and placing of apprentices, the solution of problems in discipline, and correct dealing with foremen and department heads. The committee member will consider questions submitted to him by the apprentice supervisor that involve the adaptability or attitude of an individual apprentice. Finally, the apprentice committee should be the principal factor in forming the general apprentice training policies of the plant.

In addition to these direct functions, the committee has certain indirect functions. For instance, the committee gives stability and dignity to the movement, because the mere existence of the committee indicates to the entire plant organization that the training work is taken seriously. Again, the committee inspires confidence in the apprentices and their par-

ents, relatives and friends, pastors and former teachers. To all of these, the apprentice training course appears as the preparation for a lifetime of work and must be legitimate and thorough. The existence of a committee of important officials indicates to them that much thought and attention are given to apprentice training and that the young man will be secure in the organization.

Committee Meetings Must Be Planned

The activities of the apprenticeship committee naturally center in the meetings, which will be successful or not, depending upon several factors. In the first place, the committee meetings must be real business meetings. If there is no business to be transacted, no meetings need be held. Periodical meetings, without a definite plan, devoted to the reading of lengthy minutes and meaningless reports will destroy interest.

A definite plan for the meetings should be made by the chairman, secretary or apprentice supervisor. The plan should preferably be written and it is sometimes advantageous to send copies of the plan to members in advance so that they may prepare their suggestions. The meetings should be smart and to the point and no wandering from the subject in long-winded discussions should be tolerated. The proceeding should not be stiff, but just formal enough to maintain proper dignity. They should be held at a convenient time and in a place where interruption by telephone or messenger, unnecessary conferences with subordinates, and other disturbances may be avoided.

A very considerable movement for apprentice training is on foot, based upon the needs of industry. Manufacturers see this need, but most of them fail to act accordingly. Many of them have tried apprentice training and failed. The apprenticeship committee is an excellent means for overcoming the obstacles and preventing the failures.

Basic Open-Hearth Slag

(Concluded from page 981)

reason it gives a higher weekly output for the furnace, and cuts the fuel consumption to the ton of steel. It gives a higher residue of manganese in the initial bath, and thus reduces the amount of ferromanganese which has to be added.

This latter statement may be nullified, however, if manganese is used for the deliberate purpose of affecting the sulphur content. The higher furnace loss because of the higher manganese in the pig iron is outweighed by the advantages mentioned above. The resulting slag will have a higher MnO content. This is partly utilized again if the slag is put through the blast furnace.

Of course, an eternal question in every plant is what the most suitable manganese content of the pig iron should be. This must be solved in accordance with the local conditions in the plant and the results of tests. Calculations can furnish a true picture. For steel plants using about 25 to 30 per cent of cold pig

iron, from 2 to 2.5 per cent manganese in the iron seems to be most suitable.

Essentially an Economic Question

Chiefly because of its phosphorus content, the amount of basic open-hearth slag which can be charged into the blast furnace is limited. Increasing the slag running from the blast furnace lowers the value of that by-product, and the economic relation may have to be worked out pretty carefully in each plant.

Those plants having blast furnaces alongside the steel works have a definite advantage. They can select the basic slag rich in both iron and manganese and as low as possible in silica. Slags resulting from making low-carbon steels, as well as the remainders in the ladles, are most suitable. When properly crushed and screened, this material can be made of uniform size and very suitable for charging into the blast furnace.

Only a portion of the open-hearth slag can be utilized in this manner. A certain part of it will still remain a waste product. Steel works not connected with blast furnaces are strongly handicapped by the freight charges, as well as the market situation, and in these cases the slag often becomes a burden. Nevertheless, this slag, because of its composition, does not seem to be a product which should be thrown on the waste heap or used for filling low land. There seems to be very little chance to utilize its heat in the molten state. But it is a substance which should be valuable for production of artificial building and road-making material.

True Plant Maintenance Work

(Concluded from page 989)

An example is the power shovel. It can be driven by a single or several ac. motors. It can be driven faster with less lost time and less maintenance cost by dc. motor under generator voltage control in spite of the fact that an ac. motor is still required besides a dc. generator for each motion. The same is true of mine hoists, steel mill main roll drives and some twenty other applications common to industrial operations.

Standard listed motors today are better protected from water, humidity, acid and alkali fumes and abrasive dusts than were the "special" motors of a few years ago. Research in these matters has resulted in the production of age-resisting insulations and better manufacturing procedure, thus producing better all-around units for all classes of electrical service.

Brakes and braking systems have changed for the better in many respects. Brakes themselves require much maintenance and are often the unsuspected cause of maintenance expense in motors and driven machines. Ac. solenoids are now hardly used; electric-hydraulic brake releasers are taking their place. Motor generators are furnishing dc. to brake solenoids in many cases where ac. solenoids were formerly used. Dynamic braking and regenerative braking are stopping thousands of shafts where formerly brake bands and wheels were being worn out.

If the spirit of scrutiny, which makes each unit prove its own merit, can be popularized, something

worth while will have been accomplished. Therefore, approach each unit in the plant as though it were a perfect stranger, imagine meeting it for the first time, look up its past records. Trade units around so that there will be fewer "square pegs in round holes."

Large Centrifugal Castings

(Concluded from page 996)

Navy Yard from a 14-ft. section of an old 13-in. naval gun. Sections of the muzzle end of the same gun are now serving similar purposes in some of the smaller machines. At the ends of the barrel are heavy flanges, to which are secured the removable cover-plates. Around the center of the barrel is a low, broad collar upon which is mounted the driving pulley. Two large collars, one at each end, form the roller paths. They are located midway between the center and the ends of the barrel.

The large driving pulley is keyed to the collar at the center of the barrel and is made up of four sections bolted together. It has an I-beam cross-section. On each side, between the upper and lower flanges, are a number of vanes or buckets. In the wake of each bucket a hole is drilled through the wall to the bore of the barrel. A like number of holes is drilled near the flanges at the ends. When the barrel revolves, air is forced into the interior through the holes at the center in wake of the buckets on the driving pulley and exhausts through the holes at the ends. This ventilating system prevents the barrel and driving pulley from becoming overheated and, in addition, carries away the gases expelled through the vent-holes of the insert.

The driving motor is a three-phase, a. c. motor of 30 hp., on the shaft of which is a pulley driving a 10-in. leather belt. The belt is connected with the driving pulley mounted on the barrel of the machine. Between the motor pulley and the driving pulley are two other pulleys, one an idler, the other fixed. The fixed pulley is mounted in a bracket secured to the bed-plate on the far side of the machine from the motor. The idler is mounted in a bracket secured to the bed-plate on the side toward the motor. The idler moves up or down in its bracket in such a manner as to keep the belt taut at all times. This action of the idler is made possible by a system of springs and weighted bell-crank levers.

Maximum Speed of Barrel Over 750 R.P.M.

Up until the time it was tried out, the belt drive caused considerable speculation as to whether or not it would be satisfactory. The maximum speed of the barrel is between 750 and 800 r.p.m. This means a belt speed of about 10,000 ft. per min., which is very high for leather belts. However, the machine has already been run at a speed of over 750 r.p.m., so that all fears from this source have been dispelled.

Control switches and panel are mounted on a wall a few feet from the machine. The time required for the machine to attain its maximum speed from the rest position is 5 min. From maximum speed to stop requires about 8 min. A large band brake, operated by hand with a long lever, is rigged around the barrel

and is used to assist in stopping the machine. The lubrication system presents nothing unusual. The large roller bearings are not packed in grease but run in oil.

Speed During Pouring Depends on Size of Casting

The speed maintained while making a casting depends on the size of the casting and the material of which it is made. Shortly before pouring the metal, the machine is started and brought up to the required number of revolutions. After the required speed has been attained, the molten metal is poured into a hopper. From the hopper the metal flows in a long spout, passing through the central opening of the cover-plate to the interior of the insert, where it is cast.

After the metal has been poured, the hopper with its spout is removed. The machine is kept running until the metal has cooled and solidified. The time necessary to keep the machine running after the metal has been poured depends upon the size of the casting and the metal used. Tables containing these data have been compiled for the smaller machines, and a table will be compiled for the machine under discussion as soon as the data become available. For large iron castings the time will be about 20 min.

At present there is no definite information available regarding the percentage of losses to be expected but, judging from the performance of the smaller machines, this should not be more than 10 per cent and probably will be less.

Suggestions for the Care and Conservation of Wire Rope

(Concluded from page 987)

rollers be of a larger diameter than those which are grooved. Material used for rollers may vary according to service conditions and this material must be decided by experience and the wear involved. In cases where rollers wear quickly, it will invariably be found that a knuckle condition exists, and the proper design of knuckle sheaves will remedy this.

Proper Lubrication Stressed

MOST rope manufacturers stress the value of correct lubrication. This, of course, is important if the foregoing recommendations are given due consideration. It is impossible for the manufacturer to give a new rope sufficient primary lubrication to last the entire life of the rope. Considering that in the usual 6 x 19 hoisting rope there are 114 wires, all of which are in contact at 3 or more points, it will be appreciated that there are a great number of frictional surfaces. No machine will last long without lubrication and a wire rope can be classed as a precision instrument.

It is a fact that, as soon as corrosion is initiated, it cannot be checked, although the marks of corrosion may be erased by the action of surfaces wearing on each other and each polishing the other smooth. One must therefore look farther than the surface for evidences of corrosion. First remove the lubricant from between the valleys in the wire rope and examine

Business as Others See It

Digest of Current Financial and
Economic Opinion

PERHAPS the most interesting item in the past week's grist of economic thought is the statement from two sources that the price trend of the next decade is likely to be slowly downward. Both Dr. H. S. Person, secretary of the Taylor Society, and the Alexander Hamilton Institute make this prediction. The latter ties it up with probable wage rate increases, offset by higher per-man output. Dr. Person looks for a scientific management of distribution, resulting in much lower cost in that phase of our business structure.

And one thought put forth by President Hoover at Cleveland has gained wide attention: "Our national production is over one-third of the total for the whole commercial world. We consume an average of 90 per cent of our own production of commodities. If we assume a restored normal home consumption, and hold even our present reduced basis of exports, we should be upon a 97 per cent of normal business basis."

Many are calling attention to the fact that present pessimism rests largely on disappointed hopes of an earlier recovery. Antidotes are sought, as the very feeling itself is thought to have had a large

share in retarding business operation. Emphasis is placed, here and there, on the belief that a slowly gaining movement is ahead, with local setbacks and no spectacular advance.

Alexander D. Noyes of the New York Times writes: "The very fact that disappointment of unwarranted hopes has brought the markets face to face with the realities of an unpleasant situation is the surest guarantee that the situation will be met. . . . Let us not overlook the fact that, in previous epochs of revival, our industrial achievement was based not merely on application of new and aggressive methods, but on courageous recognition of the fallacies and blunders which had prevailed before the economic reckoning."

National City Bank of New York takes much the same view: "We recognize that the depression is caused by serious and fundamental maladjustments, yet in its essentials does not differ greatly from the depressions of the past. . . . That the prospect of a possible deferment of any substantial improvement in business until next year should have a depressing psychological effect is inevitable, but this is no reason for a loss of per-

spective on current developments."

Conditions making for business recovery are present. But Harvard Economic Society finds the movement of early autumn disappointing. In spite of a poor start, however, that service says it "does not necessarily mean that the autumn movement as a whole is not to be up to seasonal expectation. . . . But the record to date is not reassuring."

Department store sales showed a larger gain in August, suggesting, says one observer, "that the bottom of the slump was reached in July." This view is elsewhere discounted, however, on the basis of "the extremely low total reported for July."

World conditions are discussed at some length by Brookmire's *Forecaster*, which finds the situation at an acute stage. "It has as its background an existing—not future—shortage of gold in relation to the international credit structure, an overexpansion in land development and the capital destruction of the World War. . . . It is now coming to be realized that we are in a period like that following the Civil War—not like the first two decades of the twentieth century."

between the strands. Secondly cut off an end of the rope, and take it apart so that all of the inside wires and the center may be examined.

It is important that the rope center should be maintained in a thoroughly lubricated state. This can be accomplished only by the use of the correct lubricant. A lubricant containing acid should never be used. The hemp center is put into a wire rope as a cushion for the strands, and to keep the rope from flattening, and also to absorb and hold a lubricant. Part of this is squeezed out into the steel wires whenever the rope travels over a sheave or drum. The correct method and proper time interval of lubricating a wire rope can be ascertained only by a close examination of operating conditions and a study of the various lubricants.

Protection in Wet Locations

General recommendations only serve to becloud the subject, as operating conditions vary to such a great extent. It can be said, however, that for an extremely wet condition a protector is essential—this becomes merely a plain lubricant where corrosion is not a factor. The various degrees between are obtained by mixing the protector and lubricant together.

It is essential, also, to employ a lubricant manufactured specifically for wire rope. In some instances a lubricant not made specifically for this purpose has been found much more detrimental to the rope than

the elements against which it has been used as a protection.

How to Apply the Lubricant

Methods employed for applying a lubricant to a wire rope again differ, according to conditions. In some cases it can be satisfactorily applied as a grease; in others, as a light oil that can be applied cold. It is essential in mine work that the lubricant be applied hot, so that it will be able to penetrate well into the center of the rope, where it will be absorbed. The best method is to run the rope slowly through a trough having a depth sufficient to allow the rope to be in the lubricant for a period long enough to allow for penetration. A wiper can be placed at the end of the box, to prevent the escape of any excess lubricant.

Booklets have been prepared by the various American manufacturers of rope illustrating several ways of applying the lubricant under varying conditions. It is well to bear in the mind that lubrication of wire rope should begin when the rope is placed in service, and that this should be continued at regular intervals throughout its service. If a wire rope is neglected for any length of time it is exceedingly difficult to obtain the correct degree of lubrication throughout its length. Hence it follows that proper and systematic lubrication, together with frequent inspections of auxiliary equipment, will increase wire rope service and make for safe and economical wire rope operation.

Business doubled by use of question mark. Material-handling equipment manufacturer has had to run night shifts. Ascribes extraordinary gain to improvements arising from questioning methods employed in each department.—Page 1049.

* * *

Man power saved in enameling plant by eliminating portable truck racks and replacing them with conveyors. Work is kept moving all the time it is not in process.—Page 1053.

* * *

For most economical performance of your material-handling system, handle as large loads as practical, and reduce the number of handling operations to a minimum.—Page 1059.

* * *

Uniform temperature in drawing furnace is obtained by staggering the gas burners on both sides of the furnace chamber. Heat is applied by means of an over-fired arrangement.—Page 1063.

* * *

Metallurgists will have aid of physicists in developing new processes. Metallurgist will suggest a method and physical chemist will determine if there are any fundamental reasons against the possibility of the method working.—Page 1067.

* * *

Saves money and floor space by using double-firing chamber enameling furnace. At each end is a preheating chamber, and in the middle two parallel heating chambers. Preheating chambers are on an incline, bringing firing chamber floor at a higher level than either end, which provides a heat seal.—Page 1054.

"Atom spacing" proves valuable aid in identifying puzzling elements. A beam of X-rays, confined by a slit system, strikes the specimen, diffraction takes place and a series of lines are obtained. Lines represent critical reflections from the atom planes. Every substance has its own peculiar atom spacing.—Page 1068.

* * *

Railroads have lost a great volume of traffic in carrying finished automobiles from factory to dealer. Truck-and-trailer, carrying four to six finished cars, cuts delivery cost. Is supplanting "drive-away" and freight car delivery.—Page 1074.

* * *

Refusal to admit there is a business depression proves great help in getting business. Material-handling equipment manufacturer is doing more business than last year. New sales policy and new shop methods have revived entire business.—Page 1050.

* * *

Cuts time required to complete orders through installation of a planning department. Planning department gages amount of work each order requires, assigns each department's time, follows order through to make certain that schedule dates are met.—Page 1050.

* * *

Faults are spotlighted by business toboggan slide. Now is the time to correct wastes. Dismissing faults or treating them lightly invites disaster.—Page 1051.

* * *

Hardened parts are automatically lowered into oil-quenching tank after leaving the furnace. Chute opening may be covered when material is to be given special heat treatment.—Page 1062.

Makes important savings by salvaging enamel dust from spray booths. Dust-collecting system conveys dust to air washers, and dust settles into a tank of water. About 3½ tons a month is salvaged.—Page 1057.

* * *

Hardening scale is removed from gears without brushing or sand blasting. Gears are immersed first in light fuel oil to rinse off heavy drawing oil, then cleaned electrolytically in alkaline solution, rinsed in cold water, scale removed by muriatic-sulphuric acid solution, and immersed in alkaline solution for neutralizing.—Page 1065.

* * *

Can you arrange the machinery in your plant in a more economical order? Many manufacturers are taking advantage of the lull to find the best layout.—Page 1051.

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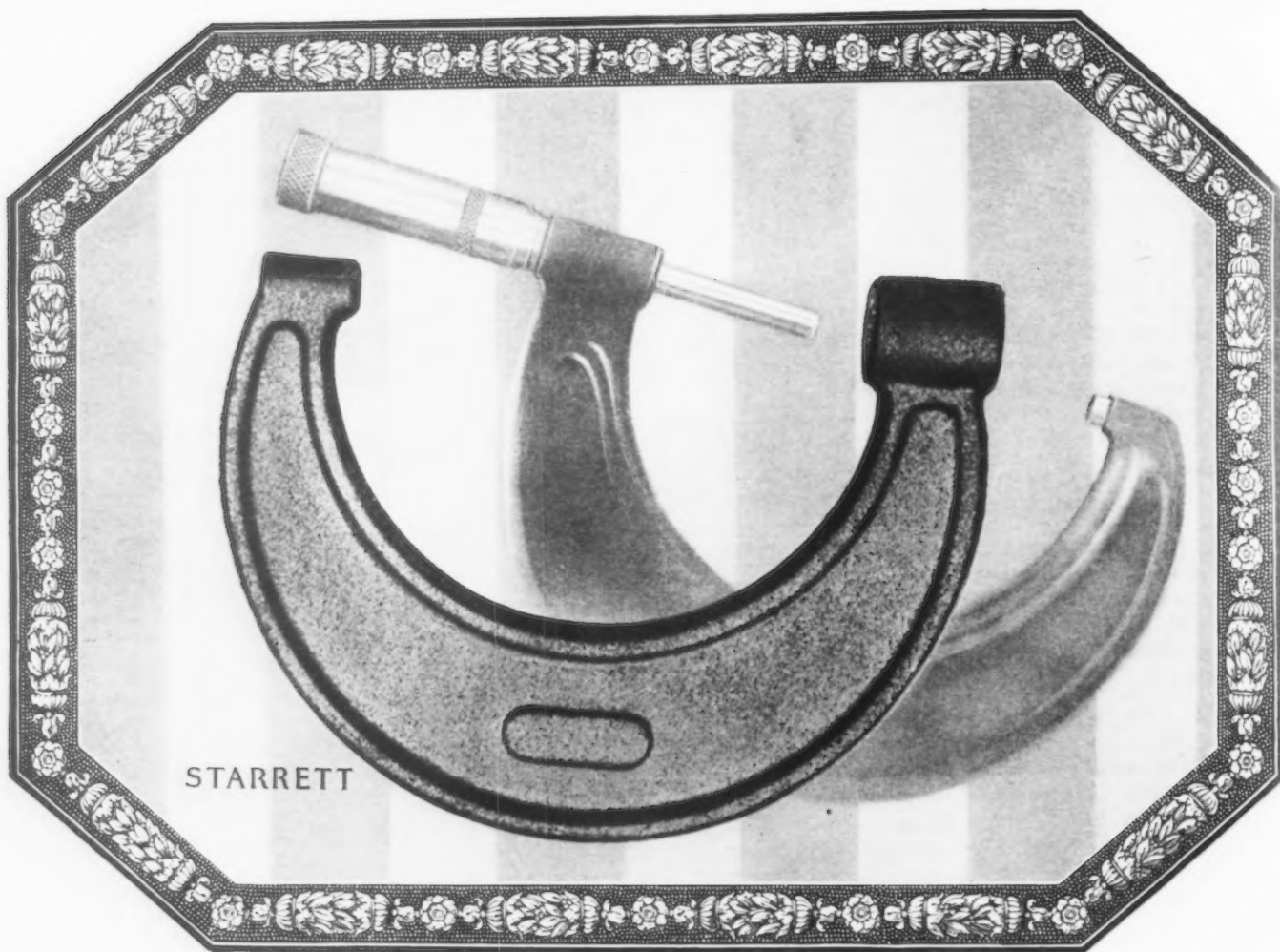
Modern machine tools enable Reo to do considerable machining in small space. Production costs lowered by ability to machine cylinder block in a 55 x 100 ft. space. No mechanical conveyors used. Chain hoists and roller conveyors carry blocks from one machine to another.—Page 1068.

* * *

Carburizing furnace is loaded and unloaded at both ends. Boxes are pushed through the furnace lengthwise in two parallel rows in opposite directions.—Page 1063.

* * *

Carburizing material cleaned in suction-pressure system. Pots are dumped over a screen over a hopper. Conveyor pipe takes material to a dust separator. Fine dust is removed and clean material drops into a hopper-type bin.—Page 1064.



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